

EXCLUSIVE! KYOSHO MONSTER MINI-Z > FIRST TEST >

RADIO CONTROL car action

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power
play!

15 PRO
SPEED CONTROLS

GEAR TO WIN!

We show you

now p.168

DYNO TESTED

Epic's latest stock
& mod muscle



OFNA Hyper 7 PCR

Is this the ultimate RTR 1/8 buggy?

Smoooooth!

Losi's cool tool
for superior
shocks



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MARCH 2004

PLUS > HRAY M18-WE DRIVE THE MICRO MASTERPIECE
TECHNOKIT TKT99J-A BIG CAR FOR A LITTLE CASH

AirAGE
MEDIA

RADIO CONTROL car action

VOLUME 19 ■ NUMBER 3 ■ MARCH 2004



COVER STARS:

Bwaaaahhh! You can't beat the beach for a dramatic sand-slinging action shot, and this time, OFNA's Hyper 7 PCR is the star. Meanwhile, Kyosho's Mini-Z Monster unleashes a load o' roost at the top of the cover and Epic's mighty mod motor anchors the bottom. OFNA action lensed by Jason Sams, Kyosho and Epic studio magic by Pete Hall.

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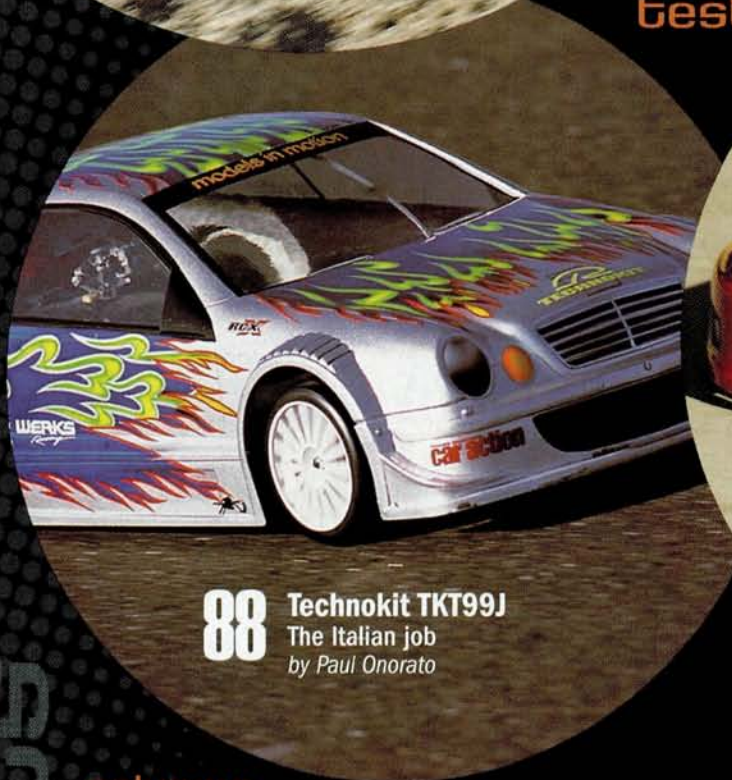


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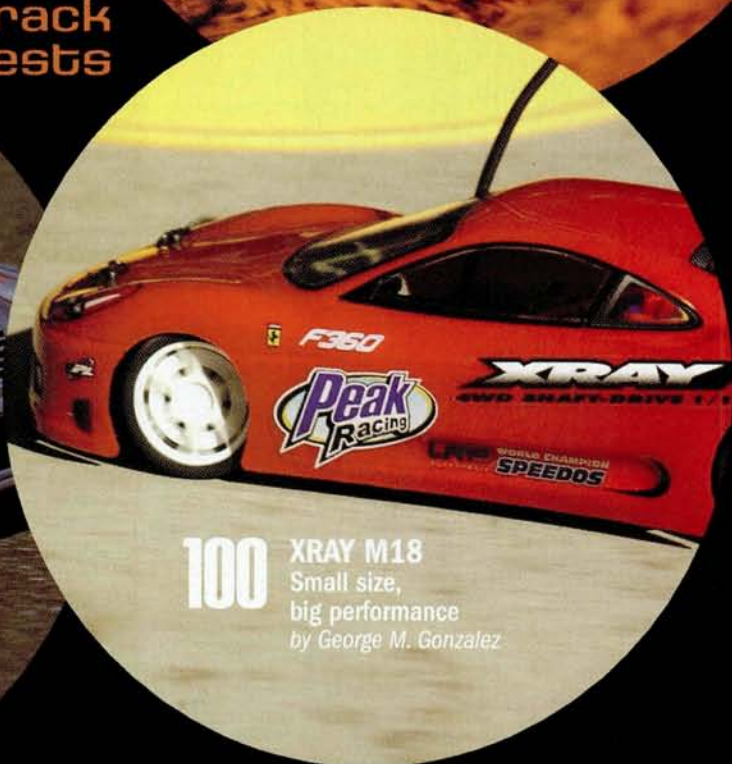


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It's electric!

Seems like a nitro world, doesn't it? Nearly every new ready-to-run is nitro-powered, the stream of new engine releases seems endless, and as for accessories—what isn't there for nitro-power these days? With all the nitro in the air, it isn't surprising that a few of us RC guys may have let the fumes get to us, and that led us to believe that RC's future is nitro-powered. And yet, electric power is still there, quietly (literally!) churning away with some of this year's hottest releases, including the Associated B4 and T4, the XRAY M18 and Team Losi's triple threat: Triple-X4 Graphite Plus, Kinwald Edition 2 and Mini-T. Electric-power technology hasn't slowed down at all; Trinity and Orion continually expand



brushed-motor performance, brushless-motor technology for RC car applications is becoming ever more refined, and battery capacity has reached an astounding 3300mAh. Remember when 1700mAh cells were a big deal?

In this issue, we have more electric gear, including dyno tests of the latest Epic stock and mod motors, Kyosho's new Mini-Z Monster and the aforementioned XRAY M18. We also cover one of electric racing's biggest events, the Cleveland Nationals; and our Competition ESC Guide has more than 14 speed controls vying for a spot in your electric race car. In short, there's a whole lotta battery-power stuff going on in RC. And while nitro power may make more noise (literally and

metaphorically), the future of electric RC remains as bright as a set of discharge bulbs on a fresh pack. So keep charging ahead!

IN THIS ISSUE

PROJECT: ULTIMATE SPRINTER

Dirt-oval guys, you'll be psyched to see this cost-no-object, big-wing machine (even if it is built as an asphalt sprinter instead of the dirt-slinging variety). Nerf bar to nerf bar, it's the most exotic way to turn left ever.

HOT MICROS!

Both the red-hot XRAY M18 and Kyosho's surprise Mini-Z Monster get the "Track Test" treatment this month. They're both micro-machines, but they couldn't be more different: the M18 is a high-performance, on-road kit with racing aspirations, and the Mini-Z Monster is an all-terrain RTR play ride. But wait; they do have one other thing in common beside size: they're both a blast to drive.

BIG CAR, SMALL PRICE

There isn't an RC guy alive who wouldn't jump at the chance to wheel a 1/5-scale car, but the big cars' equally large price tags have kept them out of the reach of Joe RC Guy—at least, until now. Technokit knocked down the dollar barrier with the TKT99j, which delivers a full-featured, partially assembled 1/5-scale ride for less than \$800. Now you don't need a lot of cash to go "big time"—just a lot of room!

Until next month,

Peter Vieira

Peter Vieira
Executive Editor

Your Trick Gear Is in Here!

The 2004 RC Car Action Buyers' Guide is the biggest ever! There are over 1300 full-color listings of must-have RC gear inside this mammoth issue, including kits, RTRs, engines, and electronics, plus all the tools, finishing supplies, accessories and support gear you need to keep your ride running. In addition to scads of products, there are helpful articles on choosing the right radio, painting tips, T-Maxx mods, answers to the most common engine questions and more. Check it out at your favorite hobby shop or newsstand, on sale in early March!



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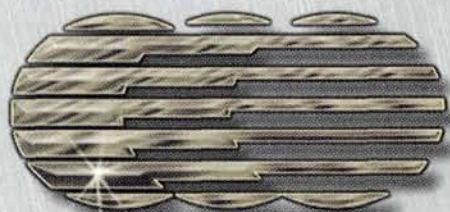
No Brain'er Body Post Markers



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Put the "No Brain'er Body Post Markers" on your posts, line up the body and press in the area over the post and the NBBPM's will dimple the body at the exact spot. No more ruined bodies. Fits most body posts from Associated, Losi, Trinity, Yokomo etc.. 4 Pieces per package.

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YES, IT REALLY WENT 52MPH

I think it's incredible that you could get the Mammoth to go 52mph. It just seems too big to go that fast, especially when you consider that the T-Maxx, Kyosho Mad Force and HPI Savage 21 all top out at less than 45mph. What did you do? Run it downhill, sacrifice the engine, or run it on 50-percent nitro? [email] *Michael Pleto*

None of the above. When we radar-test a nitro car or truck, we just set the engine for maximum top-speed performance and give it as much real estate as it needs to max out. Admittedly, our carb settings are leaner than you would want for all-day play, but if we don't set each engine for absolute maximum performance, we won't get comparable test results. If we aim for a slightly richer, "everyday" setting, one driver might richen the needle more than the next, and that could unfairly lower that car's top speed. The Mammoth is fast simply because it has tons of torque, plenty of revs and a well-gearred 2-speed transmission.

—Pete

THE SECRET OF NIMH

I was flipping through channels one day and, of course, with 900 channels, nothing good was on ... until I found a film called "The Secret of Nimh." I thought it was about battery care and how they were made, but after about 10 seconds, I realized it actually was a cartoon based on a book of talking mice and rats. So I turned off the TV and read my December issue of *RC Car Action*. Great magazine, guys. [email] *titanmarine13*

20 YEARS WASTED!

I decided to go right to the top to solicit an opinion: which 1/8-scale nitro monster truck should I buy? I am looking to get back into the RC world after an almost 20-year absence. My last two models were the Big Bruiser and the HotShot. I can spend approximately \$600 to \$700 on the vehicle, preferably a kit. I am asking for assistance to help narrow the field because of the intense information overload. Thank you for your time. *Tony Carson*

Twenty years? I can't stay away from RC for 20 minutes! Recommending a single truck as the best is tough, but since you want an 1/8-scale monster in kit form, that narrows your choices dramatically. In fact, there are just two options: the HPI Savage SS and the Kyosho Mad Force. The Mad Force comes in three flavors: standard Mad Force (includes a 3-speed chain-driven tranny and Kyosho GS21R engine), Mad Armor (same chassis and engine with a Hummer body) and RCX Edition (with an O.S. RG engine and all of Kyosho's factory option parts). The Mad Force and Savage handle very differently because of their suspensions; the Mad Force's solid-

axle setup isn't as supple as the Savage's long-travel independent suspension. The Mad Force, however, is lighter and faster. Tough call.

—Pete

HPI 12R XS—THAT'S WHAT

Hey guys; I just want to know which engine you used in your test of the R40 and what you thought of it. You overlooked this info in the December issue's review.

Tom O'Cull, Chicago, IL

It's a Nitro Star Pro 12R XS—the latest 3-port, rear-exhaust engine from HPI. It has a 3-needle, composite-plastic carburetor with a 5.5mm bore, and it rips. HPI claims 1.35hp, and it definitely makes race-ready power. And even though it's a competition engine, HPI backs it with a full 2-year warranty against defects in materials, manufacturing, or factory assembly. Pretty cool.

—Pete

CHEAP VOLTS

I'm on a low budget and in need of more speed for my Traxxas E-Maxx. I was looking at matched cells, but they are a little out of my price range (I just used all my money to buy the truck!). There are instructions at traxxas.com on how to build your own 7-cell pack using a sport pack and 1 individual cell. Is this a good way to get 7 cells into my truck? If so, how do I know which single cell to use?

Alex Dartnell



MONSTER SIZE!



Your Mini-T



Monster Traction!



Monster Looks!



3 Styles Mounted & Unmounted Long Wear, High Bite Compound Chrome Monster Style Wheels

Unmounted, with insert

TMT1000 Mini Monster T Off-Road Gnarly

TMT1001 Mini Monster T On-Road V Tread

TMT1002 Mini Monster T Street Slick

Mounted and glued with insert

TMT2000 Mini Monster T Off-Road Gnarly

TMT2001 Mini Monster T On-Road V Tread

TMT2002 Mini Monster T Street Slick

Inserts for Stock Losi "Mini T" Tires

TR34000 Soft Insert For Mini T Tires

TR34001 Medium Insert For Mini T Tires

TR34002 Hard Insert For Mini T Tires



www.teamtrinity.com

readerswrite

If you decide to add a cell to your existing battery pack, make sure you get the same brand and capacity. If you can't see through your pack's shrink-wrap to identify the cells, you'll have to remove the shrink. If I were you, I'd just save up for a pair of inexpensive 7-cell packs; Tower Hobbies has a 1900mAh version that sells for less than \$20.

—Pete

SOMEONE AT OFNA JUST GOT FIRED

I've been an avid reader of your magazine for a little more than a year now, and this is probably the first odd thing I've noticed. Pages 180 and 185 of your December 2003 issue have pictures of the new OFNA Hyper 7 PCR RTR. After looking at them for a while, I noticed that the tread on the two front tires and the right rear tire face in one direction, but the left rear-tire tread faces the opposite way. Has anyone else noticed this? This must cause some traction issues, right? Since it's an RTR, I assume the tires were glued by OFNA. Just curious.

Phil Marcketta

Yep, it's backward all right. The PCRs that roll off the production line will no doubt be correct because it will be some guy's job to do nothing but put tires on the right way. But when a

single dude has to hand-build a car as a pre-production sample, there's a much greater chance for error. Traction trouble is a moot point, since the PCRs at your dealer won't have a backward tire, but I bet that you wouldn't feel a difference if it did.

—Pete

TIRED OF ASKING

I have an Associated Nitro TC3 and was wondering how to select tires for it. I am really new to RC and unsure what "tire shore" and "mm" mean. [email]

Troy Thornton

"Shore" refers to the firmness of a tire, and "mm" is short for "millimeter" (the unit of measure for tire width). So, a 24mm/30-shore tire is narrower and softer than a 26mm/40 shore tire. Shore measurements are usually associated with foam tires, which are great for racing but not great for play. If you plan to race, ask the track operator which tires to use. If you're out for play, go with a long-lasting, firm-compound rubber tire. Venom Racing has pre-mounted sedan tires that are great for tearing up a parking lot.

—Pete

YOU SAID IT

sponsored by

TRINITY

"Tell my parents I'm old enough for RC"

I hope you can help me. I am 11 years old, and I've had a few toy-store RC cars and enjoyed them; but they don't compare to the "real thing" like I read about in *RC Car Action*. I want to get into "real" RC, and I would like to build a kit myself. I have saved enough money to buy a Tamiya Baja King and a radio for it, and I plan to use the 7.2V stick pack and charger from my toy-store car in it. I already checked to make sure that the pack will work. It has sub-C cells and a Tamiya connector. The problem is that my parents believe it will be a waste of money because they think I won't be able to put it together. I chose a Tamiya kit because I read it's great for new builders. Please tell my parents that I'm old enough for RC and help me convince them that I can do this.

Steven Demsky
Alberta, Canada



This is one time when I gotta say, "Don't listen to your parents." You absolutely, positively can build an RC car. You're obviously a smart guy, judging by your well-written letter and battery detective work, and Tamiya kits truly are easy and fun to build. You're gonna have a blast!

—Pete

Each month, "Readers Write" sponsor Team Trinity awards the "You said it" letter writer the Reference body of his choice. This is the Reference Nitro Racing Truck body.



More badass bodies!

Pro-Line T4 Chevy Silverado and B4 Crowd Pleazer

Pro-Line has a couple of new bodies for Associated's newest off-roads. The new Chevy Silverado features a super low-profile finish and still maintains that Silverado look. The new B4 Crowd Pleazer was inspired by multi-world champion Mark Pavidis; it comes complete with two wings. Both bodies are made from durable 0.030 Lexan that's covered

with protective film, and a decal sheet, window mask, spoiler and mounting hardware are included.

Pro-Line (909) 849-9781; pro-lineracing.com.

TREAD OF THE DEAD!

Team Losi

zombie-max monster truck tires

Check it out: Team Losi now makes monster-truck-size tires! Its new Zombie-Max tires have been engineered with a contoured carcass for great control and a plush ride. We've been told that the ultra-aggressive tread design finds itself equally at home on asphalt, grass, dirt, or any combination of the three, making it a true all-terrain tire. Team Losi uses an extremely soft "red" compound for wheel-standing traction on both dirt and asphalt surfaces. The Zombie-Max fits all popular "Maxx-size" monster truck wheels and is designed to be used on both the front and rear of your monster truck. Each set includes foam inserts. Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.



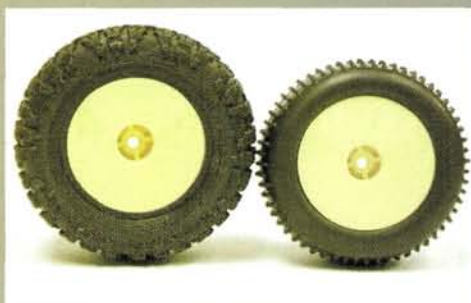
MONSTER UPGRADES

Lunsford Racing Titanium upgrade linkage kit for Monster GT and titanium springs

Lunsford's new titanium linkage kit replaces the Monster GT's stock 3.5mm turnbuckles with beefy 1/8-scale titanium turnbuckles and included 1/8-scale plastic rod ends. It also comes with new titanium ball studs and an 1/8-scale monster-truck wrench. Similar linkage kits are also available for the Traxxas T-Maxx and HPI Savage.

These wild titanium springs fit the Monster GT and Traxxas T-Maxx and are available in this natural titanium finish. The folks at Lunsford tell us that they installed only four springs on a stock truck, and "it cornered like a champ." On heavy trucks that had a ton of billet parts, they installed eight springs, and that helped the suspension react much faster. Those are some pretty trick springs!

Lunsford Racing (541) 928-0587; lunsfordracing.com.



TRC Mini-T tires

This info is so new that even the folks over at TRC haven't decided on names for these new Mini-T tires. What we can confirm is that TRC is coming out with an aggressive "mud" tire, a cool, grooved street tire and a slick. As soon as we find out names and other info, we'll pass them along!

TRC (732) 635-1600; teamtrinity.com.

NEW MINI-T TIRES

insidescoop



SPEED READER

venom Racing speed meter

New from Venom is the Speed Meter. This speedometer is easy to install and calibrate on all RC cars and trucks. It has a top-speed function that is invaluable in determining whether any setup changes you make increase speed. You can use it to track your motor usage between rebuilds by using its built-in lifetime odometer, and its trip odometer measures the distance traveled during a 30-minute Main. The Speed Meter has a built-in digital voltmeter—a great tool that allows you to check the voltage of your RC vehicle's battery.

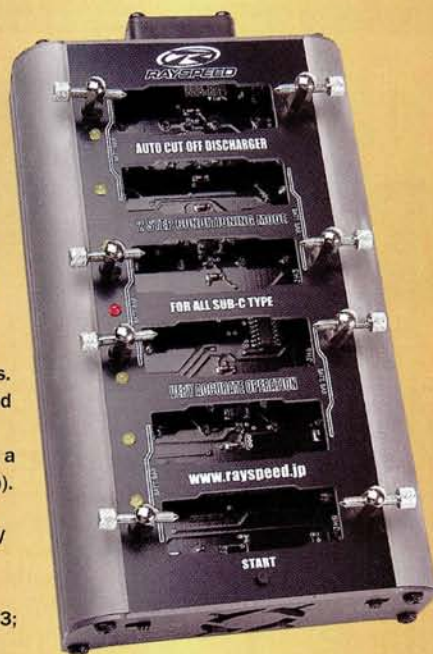
Venom Racing (800) 705-0620; venom-racing.com.

police those packs!

rayspeed RS-16 battery discharger

Rayspeed's new battery discharger will help you equalize and condition your batteries for maximum performance. It has an input voltage between 12 and 14 volts and can discharge a single sub-C cell as well as 3-cell, 4-cell and 6-cell packs. It can be used with Ni-Cd and NiMH packs and has a discharge rate of 5 amps (with a conditioning mode of 1 amp). The discharge cutoff rate is 0.9V for NiMH cells and 0.1V for Ni-Cd cells.

Rayspeed; distributed by Yokomo USA (949) 252-8663; yokomousa.com.



TRINITY

TOURING CAR RUBBER & FOAM TIRE WARMERS

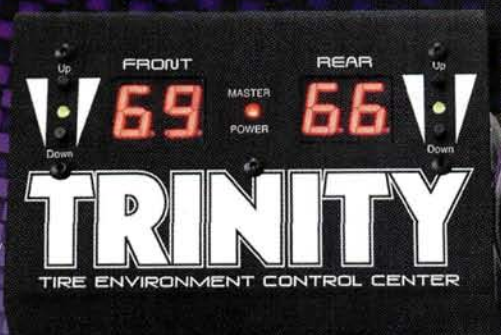
Adjusts front and rear tire temperatures separately or left and right for oval racing.

Temperature range from 01°C to 98°C, (33°F to 208°F)

Fits a maximum tire diameter of 65mm, (2.559")

Works with rubber or foam tires

Power with a 8 or 10 cell battery pack or a 12v power supply.



RC6078

DIGITAL HEAT

Super Tire Warmers

www.teamtrinity.com

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EURO TUNER

Team Losi skoda sedan body

Team Losi's newest body is modeled after a little-known European sedan: the Skoda. The Skoda's graceful profile with very low drag has been optimized for steering balance, traction and straight-line speed. According to Team Losi, the body was developed for a neutral feel, and that makes it easy to drive on both long and short courses. The Skoda fits all popular 1/10-scale, electric-sedan chassis and conforms to all IFMAR and ROAR specs. Window masks, a tunable rear wing and detail sticker sheet are also included. Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.



1/8-scale rollers

Pro-Line wabash wheels

Check out Pro-Line's latest 1/8-scale, off-road buggy wheel: the Wabash. According to Pro-Line, these new wheels offer the latest in design by incorporating 14 tapered spokes and a large hex-mounting surface for use with those oversize wheel wrenches. The Wabash is made from high-strength, ultradurable nylon material with a supershiny, supersmooth surface. It also fits a variety of popular 1/8-scale buggies.

Pro-Line (909) 849-9781; pro-lineracing.com.

LIGHTENIN' BOLT-MAXX
Fits T-Maxx
HPI Savage 21
TRI39001

HEMI-MAXX
Fits T-Maxx
HPI Savage 21
TRI39000

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C-machine 200mm

REFINOS

YOKE HAS THE POWER!

yokomo

BCS-D double DC charger

This new DC-only charger with a ton of cool features can handle NiMH and Ni-Cd batteries. The BCS-D has an easy-to-read LCD that displays voltage, charge amps, capacity and temperature. It features three charge modes: Yokomo charge, peak charge and temperature charge, and it can charge up to 12 cells. Charge amps are adjustable from 0.3 to 9.9 amps and the unit features an adjustable cutoff for voltage, capacity and temperature. It also has an adjustable delta-peak cutoff voltage, a built-in cooling fan and can charge two batteries at the same time—all in a light, compact design.

Yokomo USA (949) 252-8663; yokomousa.com.



IT'S TOOL TIME

yokomo Team Tools

Yokomo offers individual hex wrenches that will make building and routine maintenance on your RC car much easier. The precision-cut wrenches are anodized gray and come with diamond-cut handles that provide a secure grip. The lightweight wrenches are sold separately with 3/16, 1/4 and 11/32 inch tips; metric sizes include, 5.5 and 7mm.

Yokomo USA (949) 252-8663; yokomousa.com.



power pipe package

Trinity complete .21 buggy exhaust with Evo 2 pipe

Trinity now offers this complete .21 buggy exhaust with a three-chamber EVO 2 pipe. The kit comes with a polished 1/8-scale-buggy .21 manifold, coupling springs, gaskets and new EFRA 2013 polished tuned pipe. The pipe and header are all-aluminum construction, and they're designed to work with the S21BK Kanai Edition .21 buggy engine that's engineered to deliver a broad powerband with plenty of top end.

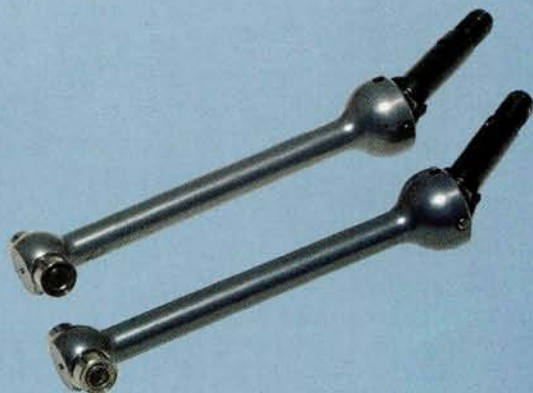
Trinity Products Inc. (732) 635-1600; teamtrinity.com.

KEEP ROLLIN'!

Team Losi BK Bones

We first spied these trick ball-bearing Losi drive shafts at the IFMAR Worlds on Ryan Cavallieri's car. Many have asked us about them, and we're glad to report that they'll soon be on your dealers' shelves. Team Losi calls them "BK Bones" because Brian Kinwald did most of the R&D on this new product. The ball bearings reduce dogbone "plunge" friction in the diff outdrives. All of the Team Losi drivers have noticed a substantial increase in corner speed and a decrease in outdrive wear. Compared with the typical dogbone end that binds under load, "it's as smooth as butter," and according to Team Trinity/Losi driver Todd Hodge, "You won't have to rebuild your diffs nearly as often." No prices or item numbers yet, but we do know that the BK Bones will be available for all Team Losi racing cars and trucks.

Team Losi; distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.





Keep it covered

RPM

B4 and T4 gear covers

RPM has new gear covers for the Associated B4 and T4. The covers are built to last and are completely sealed, thus preventing even the smallest particles from entering the gears. They come with two 4-40 mounting screws that eliminate the stock button-head screws. Since the gear cover can be removed using a ball driver, it's easy to access the pinion and spur gears; you won't have to take off the tire to get to those tiny button-head screws. For instant trackside adjustments, the gear covers also come with an oversize, soft plug for quick and easy access to the slipper adjustment nut. The covers also carry a lifetime warranty against breakage. They're available in blue and black.

RPM R/C Products (909) 393-0366; rpmrcproducts.com.

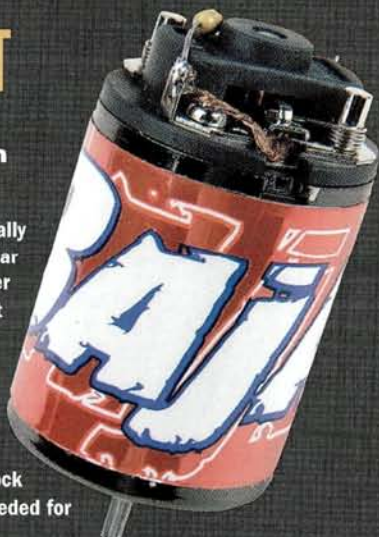
Mo' power for the Mini-T

Team Orion

Baja modified motor for Team Losi Mini-T

Team Orion has designed the Baja, a totally rebuildable modified motor for the popular Team Losi Mini-T. This a serious horsepower upgrade compared with the stock motor that it replaces, and it comes soldered with the necessary micro plugs. Changing the brushes and armatures is exactly the same for the Baja as it is with larger 540 motors, except the Baja's pieces are smaller. The motor is a direct replacement for the stock powerplant, so no additional hardware is needed for the easy install.

Team Orion Inc. (714) 694-2812; team-orion.com.



Fuel Faster!

Power Racing Products Racing fuel gun

Nothing makes pit stops faster than a precision-made fuel gun. Power Racing Products' purple, anodized-aluminum fuel gun can blast 75cc of racing fuel into your fuel tank in an instant. The sturdy gun should last many seasons of racing and is a must-have for the serious racer.

Power Racing Products (408) 988-1188; powerracingrc.com.

CARRY IN STYLE

Power Racing Products Mega cargo carriers

Power Racing Products offers a convenient and organized way to carry your RC gear back and forth to the track with its new Mega Cargo Carrier. The dual-stitched carrier contains three heavy-duty cardboard boxes for stowing spare parts, wheels and anything else you might need when you hit the track. The front of the carrier features an oversize elastic pouch for storing a gallon of fuel, and the unit glides effortlessly on four in-line-skate-type wheels. A long telescoping handle allows you to pull the transporter behind you when your parking spot is blocks from the pits. A four-way adjustable strap is located atop the carrier to secure your favorite RC ride. Power Racing Products also offers bags for monster trucks, 1/10-scale cars and smaller. The 1/8-scale carrier is pictured.

Power Racing Products (408) 988-1188; powerracingrc.com. ■





AJ SANTIAGO, IRAQ HPI MICRO RS4

This picture of an HPI Micro RS4 comes to us all the way from one of our troops, who is stationed in Iraq. Aj Santiago is a UH-60 Blackhawk helicopter pilot, and whenever he has some down time, he wrenches on his Micro RS4. The sedan is built for speed with a Team Orion Big-Block motor, Acer Racing battery, HPI ball diff, Golden Horizons front one way, universal dogbones, front and rear shocks, HSE carbon-fiber chassis, and a Futaba radio system. Aj dedicates his project Micro RS4 to his four fallen friends of 531. "To the crew of 531, You will never be forgotten. The Comancheros."

WIN A ONE-YEAR SUBSCRIPTION TO RC CAR ACTION MAGAZINE! Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids) and a brief description to "Readers' Rides," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free, one-year subscription to *RC Car Action* and will be eligible to win the "Reader's Ride of the Year Contest." Write your address and phone number on your letter and on the back of every photo you send. If you'd like to send photos by email, submit your 300dpi TIFF or JPEG images to readersrides@airage.com.



TRAVIS MILLS, RIVERSIDE, IA TRAXXAS E-MAXX

Travis's Traxxas E-Maxx isn't just loaded with a bunch of bolt-on aftermarket goodies; it has a custom chassis that he says is better suited to racing. His friend, James Zimmerman, did the design work, and Travis built a new chassis to place the battery packs lower on the chassis than the stock position. Rounding out his racing E-Maxx is a Pro-Line suspension kit, a Hitec 5945MG high-torque steering servo, Traxxas Big Bore shocks, MIP CVDs and RPM Monster Clawz wheels. Travis painted the Pro-Line Ford F-350 body himself.

MICHAEL C. MILLER, NEWPORT NEWS, VA TAMIYA CLOD BUSTER

This truck started out as a stock Tamiya Clod Buster, and in one year's time, Michael transformed it into the fully modified monster truck you see here. A JPS chassis provides the backbone, and other hop-ups include JPS gearboxes, Team Losi threaded shocks and aluminum wheels fitted with Imex puller tires. For electronics, he uses a Futaba Magnum Junior radio, Novak Super Rooster ESC and dual Phantom 15-turn double motors; Hitec 645MG servos handle the steering chores. Michael painted the Pro-Line Chevy pickup truck body. Nice work!



JAMES HILES, MARION, OH TRAXXAS T-MAXX 2.5

James painted up this Pro-Line H2 body as a tribute to his favorite team, the Ohio State Buckeyes. Underneath it is a Traxxas T-Maxx 2.5 that has been fitted with an MIP clutch, Traxxas tuned pipe, Motor Saver air filter, Golden Horizons head and TRC micro tires. James, the well-executed theme paint job and ultra-cool picture make your 4WD Buckeye mobile our Reader's Ride of the Month!

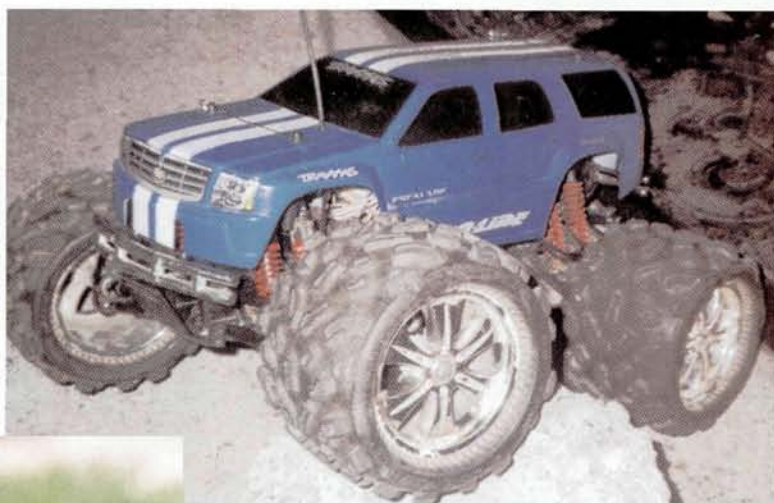
reader's ride
OF THE
MONTH



readers' rides

TYLER IDZERDA, ROLLING MEADOWS, IL TRAXXAS T-MAXX

Eleven-year-old Tyler sent us this picture of his Traxxas T-Maxx. Tyler and his father painted the Pro-Line Chevy Panel Truck body. Underneath the body, the chassis is set up for racing, and the T-Maxx has been upgraded with a Sirio .18 engine, aftermarket tuned pipe and TRC wheels and tires. Tyler hones his driving skills near his home at Venture Raceway.



BRIAN PENACHO TORONTO, ONTARIO CANADA TRAXXAS E-MAXX

This Traxxas E-Maxx comes to us from the Great White North where Brian is in the process of converting his Maxx into a custom ride. As of now, he has outfitted his truck with a Pro-Line Cadillac Escalade body complete with racing stripes, Big Joe 40 Series tires mounted on Velocity 6 wheels and a bunch of other aftermarket goodies. His big plan is to swap out the twin Titan 550 motors with a set of Hacker brushless motors; they will make this monster ballistic.

**Got
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RTR?
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up with
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Reedy Quasar AC/DC Battery Charger.

Reedy's economical #610 "Quasar" peak-detecting charger plugs right into the wall (or works from any 12V power source) and adjusts from .5 amps to 6.5 amps to charge Ni-CD, Ni-MH or receiver packs.

#610 Reedy Quasar AC/DC Charger

Reedy Tire Warmers. Be ready for racing from the very first lap! Reedy Tire Warmers work from your 6-cell battery pack to pre-heat your touring car's rubber tires to race temperature.

#608 Reedy Tire Warmers



REEDY

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**OLAERTS KRIS, BELGIUM
TAMIYA TAO4 TRF
SPECIAL CHASSIS**

When Olaerts set out to build this Tamiya TAO4 TRF, he wanted the body to look as realistic and as detailed as possible. Because he loves the German DTM racing series, he modeled his tourer after the very successful Audi TT that Laurent Aiello drives. One of the features on the body he is most proud of is the handmade carbon-fiber rear wing. For the chassis to fit under the Audi TT body, Olaerts had to shorten it by using parts from a Tamiya SS chassis. He uses a Multiplex 707 transmitter, a KO Propo receiver, an Orion Vortex brushless motor and 3300 matched cells that make his TRF run as fast as it looks. ■



**CHRIS SAGONA
MARCO ISLAND, FL
ASSOCIATED RC10L4**

Underneath this Bolink Pro Stock Camaro body is an Associated RC10L4 that has been converted into a pro-modified drag car. A Trinity D4 15-turn double motor, Novak Fusion ESC, a 3000mAh battery pack and a Futaba FM radio round out his running gear. And for where the car meets the drag strip, Chris picked up a set of Parma's rear slicks, a set of New Era's front wheels and a rear wheelie bar. Chris claims the car has been clocked at 67mph in just 137 feet.



Reedy's "Rated-X" Matched sport packs. Fully assembled in clear tubes so you can see the matching info right on the label of each cell. Don't settle for "mystery" cells in your sport packs... get Reedy's "X-Rated" packs and see the power you've been missing!

#697 Reedy "Rated-X" Sport Pack, Sanyo 3300 cells

#699 Reedy "Rated-X" Sport Pack, Panasonic 3000 cells



Reedy "Spec 19 Quad-Mag Motor." Step up the power of your RTR with Reedy's Quad-Magnet "Spec 19" Motor! A great choice for the B4 RTR, the TC3 RTR, or any Ready-to-Run electric with a speed control rated for a 19-turn or less motor.

#513 Reedy Spec 1 "Quad-Mag" Motor



ONLY \$64.99

ONLY \$59.99

Reedy Ni-MH Receiver Packs for Nitro Cars and Trucks. Reedy receiver packs give you the long-lasting, reliable power needed for nitro racing, and have a great low price that makes them your **BEST** choice!

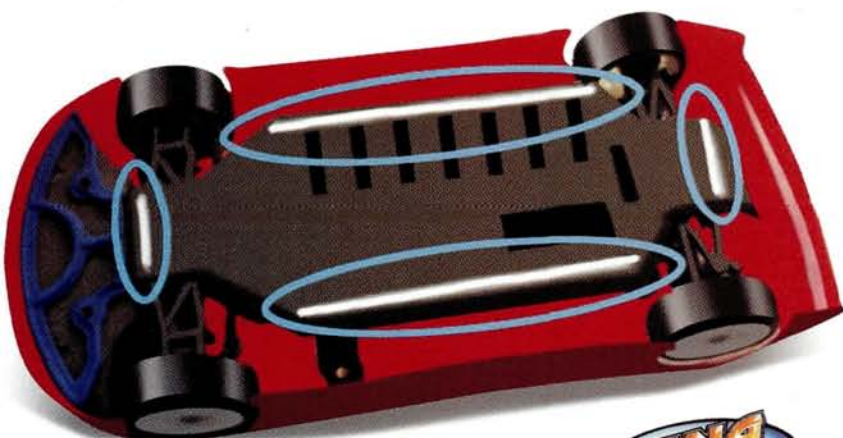
#615 Reedy Ni-MH Receiver Pack, (Hump style for RC10GT, Monster GT, Etc.)

#614 Reedy Ni-MH Receiver pack, (Flat style for Nitro TC3, etc.)

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3585 Cadillac Ave. Costa Mesa, CA 92626

WIN AN OFNA YO-YO & AN RC CAR ACTION SUBSCRIPTION!

Do you have a winning idea? Share it. You could win a 6-month subscription (or an extension of your subscription) and an OFNA yo-yo. The monthly "Tip of the Month" winners will all be considered for a grand prize—an OFNA RTR. Send a sketch or photo to "Pit Tips," RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Print your name and address clearly on each tip you submit. You may also email your tip to pitips@rccaraction.com. Sorry, we can't acknowledge every tip or return the ones we don't use.



CARPET CLEARANCE

To find the correct ride height for carpet racing, mark the bottom of your chassis with a white china marker. Run a few fast laps during practice, and check the bottom of the car. If the marker is completely removed, raise the ride height until the marker is only partially removed. If you run a few laps and the marker remains completely intact, then lower the car until only some of the marker is removed.

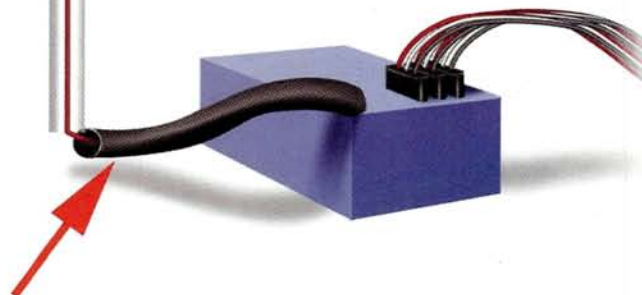
*Rick Holmes
Torrance, CA*



GRAPHITE GLITCH-PROOFING

A graphite chassis is a huge performance booster, but it can also cause serious radio-glitching problems if your antenna wire comes in contact with the graphite. To prevent this from happening, use a piece of heat-shrink tubing to further insulate the antenna where it touches the graphite. Just cut the correct length needed for your application, and slide it onto the antenna.

*Tom Casey
Phoenix, AZ*



PISTON PLACE

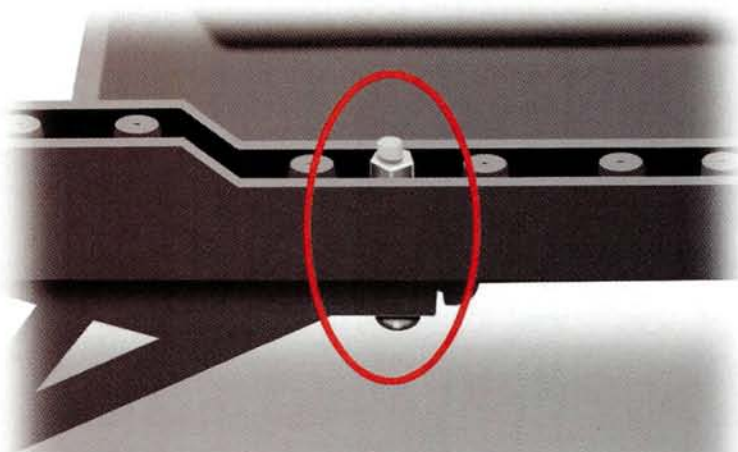
Many kits come with assorted shock pistons, and since they're an important part of suspension tuning, you don't want to lose them. An old shock shaft or hinge pin makes an excellent storage device for these parts. If you use a shock shaft, thread a nut on the threaded end, and secure the pistons by placing an E-clip on the other end. Use two E-clips if you use an old hinge pin. It's also a good idea to store the pistons according to hole size and number, so you'll easily find the one you want.

*Michael Fulton
Bristol, VA*

STURDY STAMPEDE

The rear skidplate on the Traxxas Stampede must be removed for maintenance. This can lead to stripped screw holes. To remedy this, drill a slightly larger opening completely through the chassis where the stock 12mm self-tapping screw was installed and then insert a bolt that is at least 20mm long. Top off the bolt with a nut and some thread-locking adhesive. Your truck's chassis will be much stronger and just as easy to work on.

*Nick Morgan
Miami, FL*





STARTER-CORD QUICK FIX

After a lot of yanking, a nitro-engine's recoil starter cord may stretch, but you don't always have to replace a stretched-out starter cord. Instead, slowly bring the cord out until it is fully extended, then slide the handle down and make a new knot below the original knot. This will take up the slack and make your recoil starter work as good as new.

Randy Weir
Webster, TX



PERFECT-SIZE COOLING PORTAL

An easy way to make ROAR-legal-size cooling holes in your sedan's windshield is to use an old 2-inch-diameter sedan rim. Just place the rim on the windshield and trace around it with a Sharpie marker. Then use a body reamer to punch through the windshield in the middle of the circle. Cut out the cooling hole using a pair of curved Lexan scissors starting at the hole you just created. Be sure to stay inside the traced circle, and your cooling hole will be perfectly legal-sized.

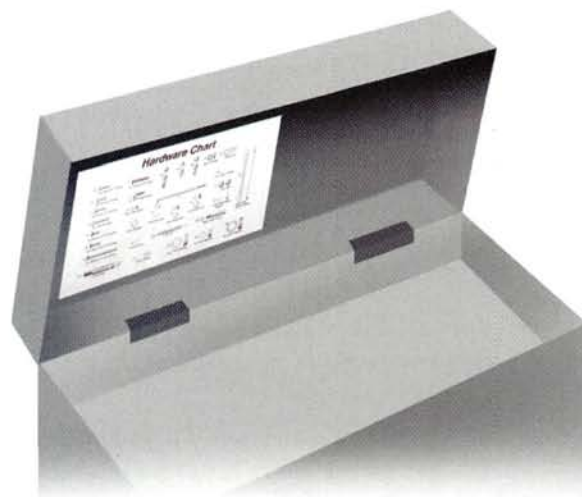
Roger Thompson
Santa Anna, CA



EASY TRACTION ACTION

To adjust the firmness of a tire insert, use a standard, hand-held, single hole punch. If an insert is too firm, punch out evenly spaced holes starting along the center of the insert. How much material you remove will determine how soft the insert gets. Just be sure that the hole spacing is uniform so the insert stays balanced and is equally firm all the way around.

Stephan Ford
Mount Morris, IL



QUICK HARDWARE HANDBOOK

Many RC manuals include a hardware legend for properly sizing screws as you assemble the kit. These legends aren't just helpful resources during the initial build, they are also extremely useful during repairs and regular maintenance. Photocopy and paste the hardware legend to the inside lid of your toolbox. That way it will always be handy. You can also protect and cover it using clear laminating sheets.

Jon Patricio
Tacoma, WA

"Pit Tips" are submitted by readers and are screened for functionality, feasibility and safety but are not tested by Radio Control Car Action. Radio Control Car Action and the submitting authors are not responsible for personal injury or damage to models or tools resulting from readers' use of "Pit Tips." Readers are strongly encouraged to check their equipment's warranty before they perform any modifications.

troubleshooting

YOU'VE GOT PROBLEMS? WE'VE GOT FIXES.

BY STEVE POND

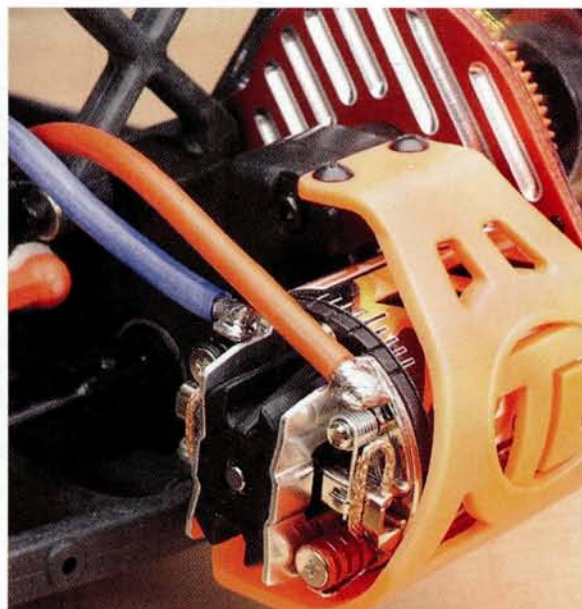
► **NEED HELP?** Send your "Troubleshooting" questions and comments to troubleshooting@airage.com, or mail them to "Troubleshooting," c/o RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

Q BACKWARDS ACTION

I have a new Losi Triple-XT truck, and it's the first kit I've ever built. I took my time building it because I didn't want to make any mistakes. I put everything together and mounted a painted body that I bought because I wanted my pride and joy to look good; then I headed out to give it a dry run at the track. I strutted around like a peacock and showed off my new rig to anyone who asked to see it, and then I set the truck down for its first run. I then made a total fool of myself when I pulled the throttle and the truck took off. I have never seen anything take off so fast—in reverse. Everyone laughed at me, and I couldn't pack my stuff in the car fast enough! I wanted to get home and figure out the problem. [email] Jay S.

A You may have connected the motor leads backwards. Assuming you soldered everything when you installed your electronics, it's possible that you "swapped" the positive and negative leads; this would explain your problem. Another possibility is that the leads are incorrectly soldered to the speed control. This isn't as likely because the manufacturer usually solders these leads into place, but I've learned that anything is possible. If you bought a used speed control or have soldered new wires onto it, check that all the wires are attached where they're supposed to be.

Last, if these two suggestions don't work, you should check your motor to make sure the endbell hasn't been flipped around 180 degrees. This happens more often than you might think. This will cause the motor to run backwards. Contact the motor manufacturer to see whether there are any marks on the can or magnets that might help you identify the proper orientation of the endbell.



If your motor runs backwards when you hit the throttle, you've attached the motor wires to the wrong contacts or improperly oriented the endbell. This Orion motor uses color-coded brush heat sinks to minimize the chances of an incorrect hookup: red is positive; black is negative.

REAL PERFORMANCE PRODUCTS!

T-Maxx/2.5-Maxx Steel Top Shaft

NEW



This precision machined **hardened** steel top shaft will fit all T-Maxx. Includes oversize ball bearing. RRP 8525

T-Maxx/2.5-Maxx FORWARD ONLY Steel Gear Kit

NEW



This kit contains a 26T **hardened** steel output gear, a forward drive hub adaptor, steel spacer and Pin. RRP 8586. **Hardened** aluminum version RRP 8585.

T-Maxx/2.5-Maxx Hardened Forward Primary Gear

Precision machined from solid steel and then **hardened**. RRP 8529. **Hardened** aluminum version RRP 8528.



NEW

T-Maxx/2.5-Maxx Forward Primary and Reverse Gears

NEW



This kit contains a precision machined **hardened** steel primary forward gear, a **hardened** aluminum reverse gear and pin. RRP 8521

MAKE NO COMPROMISES!

T/E-Maxx/2.5-Maxx Accessory Spurs



A wide range of spurs fit our Double-Disc Slipper Kits. Choose from machined Super-Tough plastic spurs in 66, 68, 70, 72, 74 and 76T sizes, RRP 82XX, or CNC machined steel spurs available in 65, 72 and 76T sizes, RRP 83XX. Small Clutch Plate/Gear Adaptor fits 65 thru 70T spurs. Large Clutch Plate/Gear Adaptor fits 72 thru 76T spurs.

T-Maxx/2.5-Maxx Primary Reverse Gear

NEW



This gear is precision machined from solid aluminum and **hardened**. Includes pin. RRP 8522

T-Maxx/2.5-Maxx Lightened Spur And Double-Disc™ Slipper Kit



RRP's NEW line of Lightened Spur and Double-Disc Slipper Kits for Traxxas Nitro and T/E-Maxx/2.5-Maxx trucks are designed to improve performance and increase reliability. This combo incorporates a machined steel or Super-Tough plastic spur, a Vented Aluminum Clutch-Plate/Gear Adaptor, 2 Slipper Pads and 2 Plates to deliver the adjustability you need and the increased performance that you demand. **Complete Slipper Kits** are available in the following sizes: RRP 8166 Slipper Kit with 66T Super-Tough plastic spur (Stock Size) for E-Maxx RRP 8172 Slipper Kit with 72T Super-Tough plastic spur for Traxxas Nitro RRP 8465 Slipper Kit with 65T Steel Spur for Traxxas Nitro RRP 8472 Slipper Kit with 72T Steel Spur (Stock Size) for T-Maxx Spurs, Clutch-Plate/Gear Adaptor and Slipper Pads also sold separately.

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Q SPRINGY SAVAGE SS

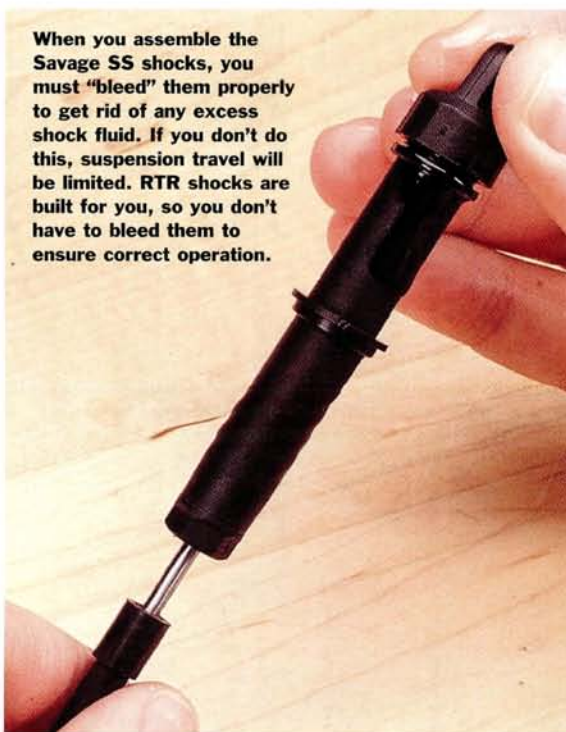
I just finished building my HPI Savage SS. I compared it with my friend's original Savage .21 (that's why I got the SS), and I noticed that his suspension compresses more easily. My suspension also gets stiff when I press it down more than halfway. Is there something wrong with my truck, or his truck, or is this just one of the differences between the two models?

S. Paul
Manhasset, NY

A The shock absorbers in the Savage SS kit don't have inner bladders to compensate for the changing volume inside the shock when the suspension is compressed. When you build the shocks, you must be careful not to put too much oil in them. When there's too much fluid in the shocks, they will reach a point at which they get hydraulic lock and can't be compressed any farther. The Savage SS instructions aren't very clear on this procedure, and this has resulted in our receiving a few of these emails such as yours.

Assemble the shocks as shown in the manual, and then fill them with shock fluid and let them sit for a few minutes. Next, work the shock shaft up and down a few times to help get rid of most of the air bubbles. Screw the shock cap on loosely in place without completely tightening it. Compress the shock all the way while you allow the excess fluid to bleed out of the shock body. Then, draw some oil from the shock using paper towels or a clean rag until the oil level is about 3mm from the top. Then install the shock cap. It will get a little messy; do this where spilling a little shock fluid won't be a problem. Once you're able to compress all the shocks all the way without any binding or stiffness, you've got it nailed, and the truck should handle better.

When you assemble the Savage SS shocks, you must "bleed" them properly to get rid of any excess shock fluid. If you don't do this, suspension travel will be limited. RTR shocks are built for you, so you don't have to bleed them to ensure correct operation.



T/E-Maxx/2.5-Maxx Steel Diff Gear Set



T/E-Maxx/2.5-Maxx differential gear set, includes: 1 beveled pinion gear, 1 beveled spur gear, 4 re-usable stainless steel phillips head screws, 1 tube Associated Black Grease, and a shim kit for spider gears with 10 .003" shims. 2 sets needed per truck. RRP 8590

DON'T SETTLE FOR SECOND!



T-Maxx Vented Flywheels



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 8551 Blue, RRP 8550 Natural Silver
NEW 2.5-Maxx Vented Flywheel, Blue Only RRP 8552.

T/E-Maxx/2.5-Maxx Replacement Pinion



This precision machined steel pinion fits RRP 8590 Diff Gear. RRP 8591

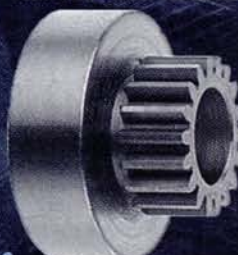
T-Maxx/2.5-Maxx Aluminum High Performance Brake Kit



New, lightweight aluminum high performance brake kit, includes bigger, more aggressive brake pads and steel backing plates. One piece vented rotor minimizes side-to-side wobble. Also fits newer T-Maxx. RRP 8562. Older style half shafts use Brake Kit RRP 8560.

www.robinsonracing.com

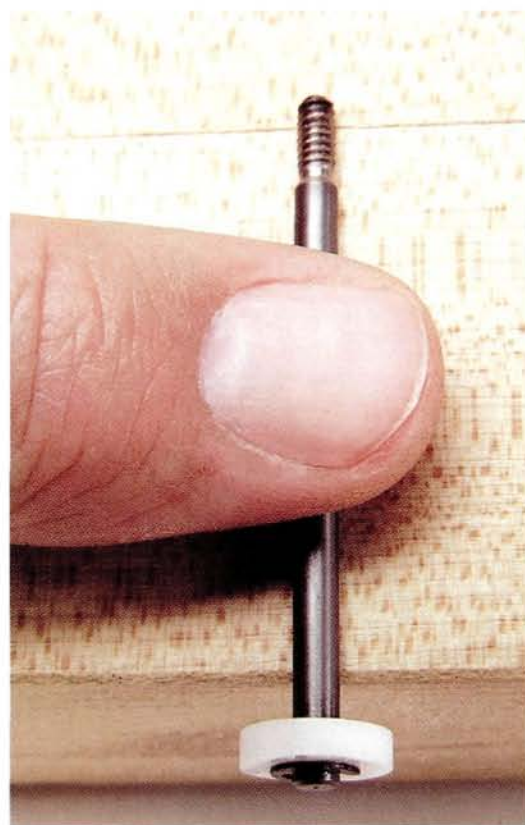
T-Maxx/2.5-Maxx Hardened Steel Clutchbells



CNC Machined from solid steel these bells are built to last. They take the 5x11 bearing (NOT included). Available in 19T, RRP 8119, 20T RRP 8120, 21T RRP 8121 and 23T RRP 8123.

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Q COMPRESSION AGGRESSION

I have a B3 buggy, and I recently noticed that the rear suspension sticks occasionally. Every once in a while, the left rear wheel/shock just sticks in the compressed position, and it doesn't rebound. I took that whole side of the suspension apart to see whether I could find something that was binding that may have caused this problem. Everything seemed to be working OK, so I put it all back together figuring maybe a rock or something else may have been causing the problem but had since been jarred loose. I couldn't believe it; when I ran the car again, the left rear suspension compressed and stayed there a couple of minutes. [email]

John Barr

A I think you have a bent shock shaft. The suspension should feel fine as long as you don't compress it all the way. But once you try to go beyond a certain point, the bend in the shock shaft hits the shock body and forces the shock piston against the shock body's interior wall. If you hit a big enough jump and the landing force is enough to compress the suspension to the point at which the bend in the shock shaft is now inside the shock body, there's a good chance that the shock will not rebound on its own. Try cycling the suspension through its full range of motion. If you feel a tight spot, remove one end of the shock absorber and compress the shock again. If the suspension assembly easily rebounds to full extension, then it's pretty certain that the problem is the shock shaft.

If the suspension randomly locks in the up position, check the shock shaft. If it's severely bent, the shock will bind when it's compressed, and it may not be able to rebound. To check for a bent shaft, roll it on a smooth, flat surface; you'll be able to feel even the slightest bend.

RC10-GT Steel Combo



Precision machined from solid steel, then hardened, this 65T spur and 15T bell combo will last and last. RRP 2365

RC10-GT Hardened Steel Idler Gear



Cut from solid steel stock, this RC10-GT gear is lightened and hardened for super quiet precision and extra long life. Black tranny grease included. RRP 2213

Associated Titanium Stealth Top Shaft



CNC Machined from solid titanium, this super hard, super light top shaft will fit any Stealth transmission. RRP 1512.

www.robinsonracing.com

RC-10GT 32 Pitch Spurs



Precision machined from heat-resistant, super tough plastic, these spurs mesh flawlessly with our Clutchbells. Available in 63T thru 67T, RRP 2263 - RRP 2267.

Hardened Diff Gear



Hard anodized, precision CNC machined aluminum diff gear. RRP 1513 RC10-GT

RC-10GT Hardened Steel Clutchbells



These steel Clutch Bells are CNC machined from solid steel then the teeth are machined on. This makes the part stronger with less gear "run out". Available in 14T thru 20T, 22T and 24T. RRP 22XX

DON'T SETTLE FOR SECOND!

TC3 Ultra 48 Pitch Spurs



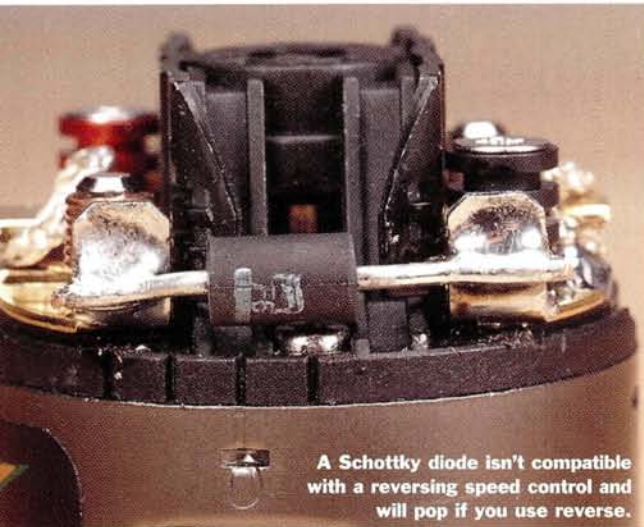
Precision machined from heat-resistant plastic, these spurs mesh flawlessly with our pinions. Available in even numbers from 70T thru 80T, RRP 1670 - RRP 1680.



Q POPPIN' MAD

I bought a used modified motor from a friend who had raced it only for a few weeks. He didn't like it, but I don't race like him, so he sold it "for cheap." I installed it in my car, and when I went into reverse, I heard a loud popping. When I checked the motor, I noticed this little black thing soldered to the motor and it had blown up. I don't know what it was for, but it blew up when I put it in my car. I just hope I didn't screw anything up. [email]

T. Soraci
Carlsbad, CA



A Schottky diode isn't compatible with a reversing speed control and will pop if you use reverse.

A Don't sweat it. You blew up the Schottky diode. I guess that your friend had a race car with a forward-only speed control (no reverse). Some electronic speed controls come with a Schottky diode that helps to enhance braking. Schottky diodes can't take reverse voltage and will pop if installed on a motor that is powered by a speed control with reverse. ■

TOOLBOX



Tuning Tools

TSIAS makes these cool tuning tools for detail-oriented mechanics who need to know exactly how much of an adjustment they're making. The TSIAIS tuning screwdriver, and 2mm and 5/64-inch

hex-head tip drivers are used to precisely adjust fuel mixture and all types of 2-speed transmissions.

These special tuning drivers have indexing marks on their handles and on a spinning collar near the bottom of the handle. By holding the lower collar steady at the bottom of the handle while you make the usual adjustments with the tool's main handle, you'll see by the indexing precisely how much an adjustment you made.

TS2001L; Ultimate Fuel Mixture Tuning Tool (170mm); long flat-head tip; \$22.95.

TS2002M; Ultimate 2-speed tuning tool (2mm); hex-head tip; \$19.95.

TS2002U; Ultimate 2-speed tuning tool for nitro TC3 (5/64-in.); Hex-head tip; \$19.95.



HPI Savage 21 Nitro Steel Combo



This new 52 tooth Spur and 14 tooth Clutch Bell are CNC machined from solid steel and then hardened for unmatched performance and durability. RRP 7052

NEW

HPI Savage 21 Nitro Vented Flywheel



Aluminum vented flywheels move air over clutch bell, improving performance and cooling. RRP 7000

NEW

Stealth Spurs



These precision machined spur gears are super quiet. They're available in 48P in 60T thru 96T sizes, and fit any Associated or HPI electric car or truck. RRP 1860 thru RRP 1896.

Electric Car And Truck Pinions:

48P Absolute Series Pinions



Super hard, lightened and cut with unmatched precision. Great with any spur, but with an Absolute spur, even on-off noise is gone! Available in 48P in 16T thru 28T sizes. RRP 1416 - RRP 1428.

48P / 64P SuperLite Aluminum Pinions




They're lightened, hard coated and precision cut. Available in 48P in 16T thru 28T, and 64P in 24T thru 38T. RRP 30XX (48P) and RRP 31XX (64P). Only \$5.25

48P Hard Nickel Plated Steel Pinions

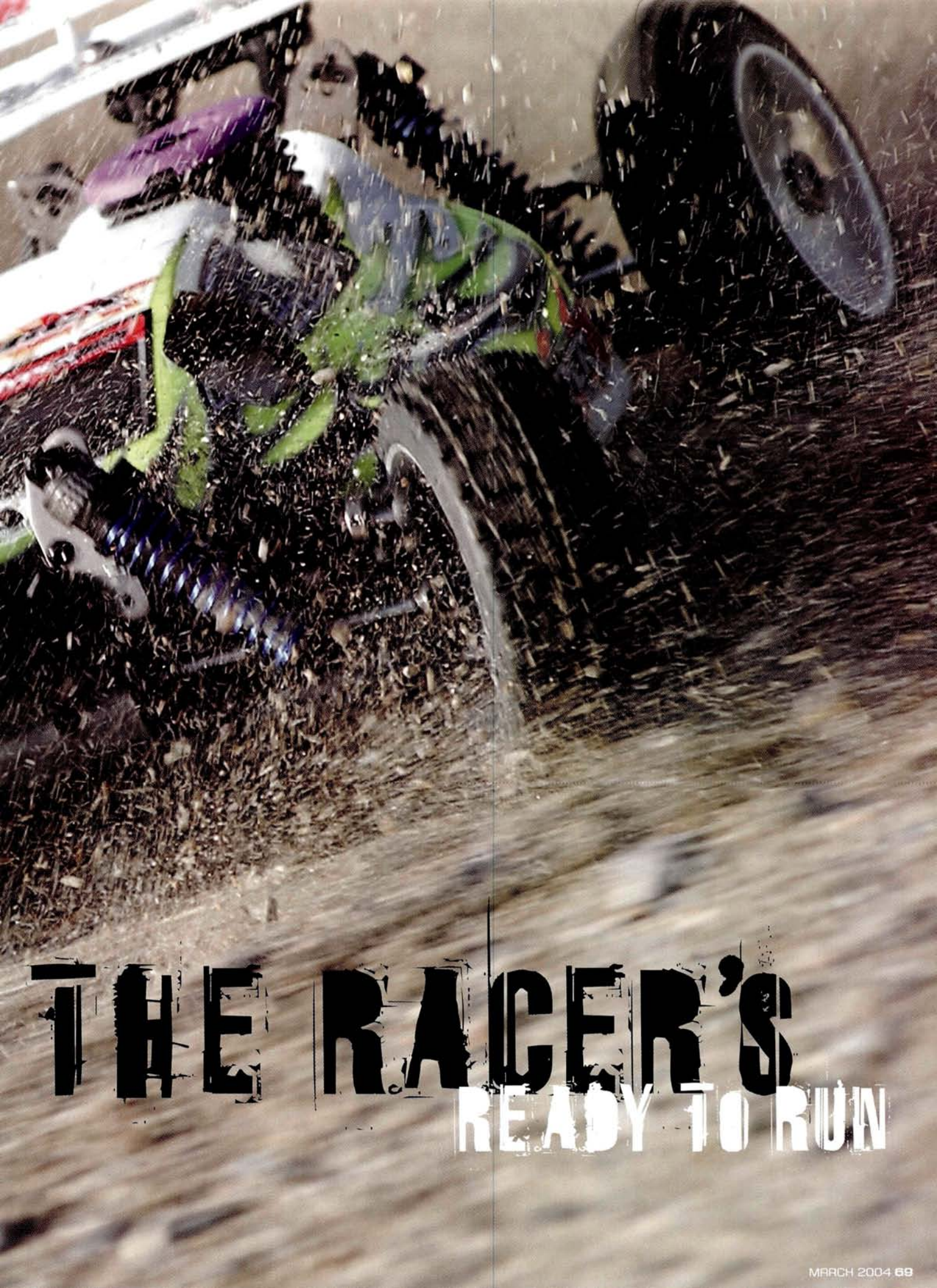


These precision cut gears have an extremely hard coating that makes them really last. Available in 12T thru 35T. RRP 1012 - RRP 1035

OFNA Hyper 7 PCR RTR



THE ANSWER IS YES. Just about any question you have about what is included with OFNA's new Hyper 7 PCR ready-to-run 1/8-scale buggy can be answered with that one little word. Starter box, spare glow plug, glow-starter, fuel bottle, wheel wrench ... they're all in the box. It's an impressively complete 1/8-scale buggy package, but the box isn't the only thing that's stuffed. Feature-wise, the Hyper 7 PCR is crammed full of good stuff, including an 8-port engine, laydown servos, front and rear pivot-ball suspension and a hard-coat finish on the chassis and shock bodies. If that sounds like racing gear to you, it should; after all, "PCR" stands for Paul Coleman Racing, and Paul is OFNA's go-to guy for going fast. Put away your wrenches and break out the fuel!

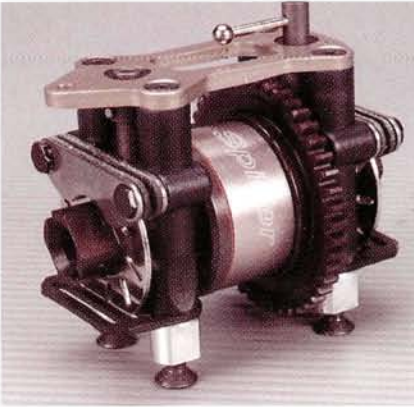


THE RACER'S READY TO RUN

KIT FEATURES

CHASSIS. If you've been paying attention to trends in on-road nitro car design, you already know that laydown servos are the latest rage. With the servos on their sides (instead of standing up), their mass is held lower in the chassis. That reduces the car's center of gravity (CG), and a lower CG always improves handling. But who says only on-road cars can benefit?

The PCR's servos get the laydown treatment; they're squeezed between a 2mm aluminum radio tray and the main chassis. The receiver gets its own compartment with a four-bolt lid and silicone-boot on/off switch, and two holders are provided for the receiver pack. The factory-installed holder clamps the included 4-cell AA box, and the spare is configured for a 5-cell rechargeable "flat" pack. The 3.5mm, 6061 aluminum main chassis is hard-coated and fully countersunk (of course), and wide, plastic stone guards are wrapped under the body shell to keep the worst out of the works. Plastic braces buttress the gearboxes, and aluminum versions are an available option. I consider them more of a style mod. Unless you're gunning for a national title, the chassis is stiff enough straight from the box.



Left: each end of the PCR's drive train gets its own vented disc brake. Note the aluminum standoffs that support the bulkheads; they actually pass all the way through the bulkheads to meet the top plate. Stiff stuff.

Right: here's a look inside the center diff. Six spider gears are crammed into the machined-aluminum housing, and a steel spur gear clamps everything shut. O-ring seals (not shown) let you tune diff action with silicone fluid.



DRIVE TRAIN. The PCR doesn't stray from the 3-diff, shaft-driven 4WD formula, but it's the detail that counts. A lot of those details are concentrated around the center diff. Its machined-aluminum housing contains six spider gears. Most diffs have two and better diffs have four, so OFNA earns big durability points with its six-gear setup.

O-rings seal the housing against the hardened-steel spur gear, so you can tune diff action with silicone fluid—after you've cleaned out the stock grease. Each end of the diff holds a disc brake with a vented rotor and padded caliper, and there's room for a quad-disc setup. The front and rear diffs are more conventional: they have plastic housings and four internal gears, and thanks to their O-ring seals, you can also swap their grease for thicker, silicone goo.



INCLUDED ELECTRONICS & ACCESSORIES

HYPER STARTER BOX

OFNA chucked the tin-box concept in favor of sleek plastic construction for the Hyper 7 PCR's included starter box. A single Mabuchi 750 motor spins the starter wheel via a geared transmission and belt final drive, and the pressure-activated switch has a mechanical lockout to prevent it from being depressed if you use the starter box as a work stand. There's also a master on/off switch to prevent the box from chugging away inside your pit bag.

Battery installation is easy; a pair of stick packs fit into a compartment under the box, and a screw-on lid keeps them neat and clean. The chassis-locating pins are a perfect fit under the PCR, and the box does a good job of turning over the Hyper 8-port engine. Added bonuses: the plastic box is much quieter and lighter than a metal job, and a spare starter wheel is included.

and bright orange plastic "garbage can" body. I use a D-size rechargeable cell in mine; alkalines quickly lose the necessary "oomph" to really blast a glow plug.

OFNA FUEL BOTTLE

Squishy plastic body, large-diameter filler spout, cap with lanyard. It's a good bottle; not a big bottle, but a good bottle.

TOOLS

OFNA did a good job with the PCR toolkit. In addition to the usual 4/5/5.5/7mm box wrench, the buggy includes a "man-size" cross-wrench. OFNA even includes a massive (8mm) hex wrench for the pivot-ball retainers, a 5mm wrench for the pivot balls and smaller wrenches to fit the other hex fasteners.

OFNA RADIO SYSTEM

"No frills but reliable" is the best way to describe the PCR's radio setup. The 2-channel AM transmitter has a single-LED battery meter, servo-reversing switches and trim knobs—that's it. The servos are "standard" units; they're good for about 40 oz.-in. of torque. That's adequate for the throttle and brake, but it isn't enough power to really let the PCR's handling shine through.

OFNA GLOW IGNITER

I've come to love OFNA's standard-issue glow igniter. It accepts a C or D alkaline battery, and the clamping mechanism is sturdy. It's difficult to lose thanks to its extra-large size

you'll need

- Two stick-type battery packs
- Charger
- Fuel
- 12 AA batteries
- One C or D battery

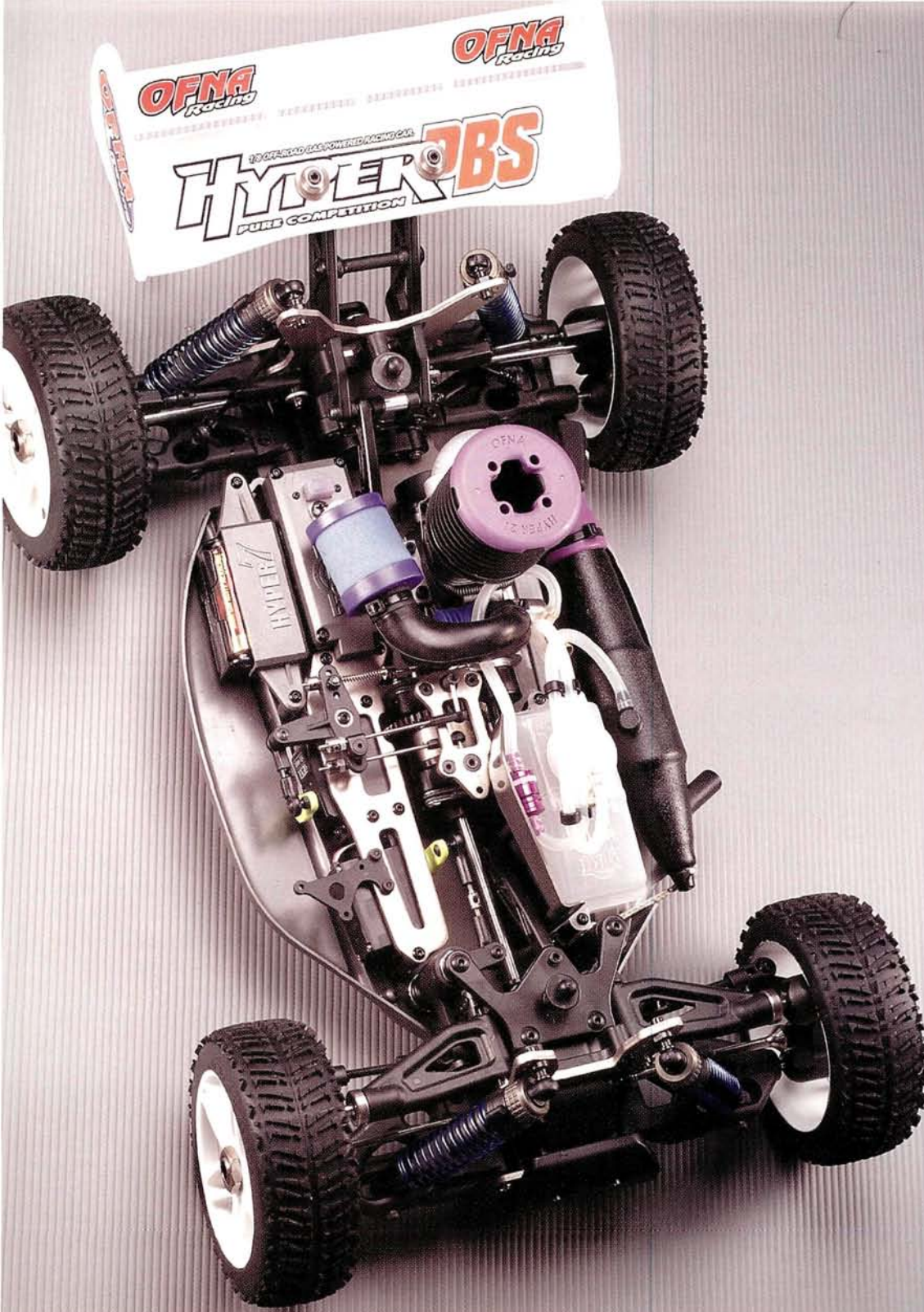
factory options

- PAUL COLEMAN RACING MACHINED 7075 ALUMINUM PARTS**
- Front hinge-pin holder—item no. 19700
 - Center top plate—19709
 - Rear toe plate—19714 (2 deg.), 19715 (3 deg.)
 - Shock towers (F/R)—19702/19712
 - Chassis braces (F/R)—19707/19710
 - Rear wing stay mount—19711
 - Steering slider—19703

THE COMPETITION

The Competition	Chassis	Ball bearings	Drive axles (F/R)	Spur gear	Transmitter	Engine	Starter box	Price	Reviewed
DuraTrax Axis RTR	3mm aluminum	Shielded	Universal/dogbone	Plastic	DuraTrax by Futaba	Torq .21	Not included	\$500	3/00
Kyosho Inferno MP-7.5 ReadySet	3mm aluminum	Shielded	Dogbones	Plastic	Kyosho Perfex	Kyosho GX-21	Not included	\$490	8/03
GS Racing Storm RTR	3mm aluminum	Shielded	Universal/dogbone	Steel	JR XR3	GS .21	Not included	\$560	11/01
OFNA Hyper 7 PCR RTR	3.5mm hard-anodized	Rubber-sealed	Universal/dogbone	Steel	OFNA	Hyper 21 8-port	Hyper	\$550	3/04

Prices vary with dealer. Category too large to list all.



SPECIFICATIONS

MANUFACTURER OFNA
MODEL Hyper 7 PCR RTR
SCALE 1/8
PRICE \$550
Varies with dealer

DIMENSIONS

Wheelbase 12 75 in (324mm)
Width (F/R) 11 75 in
 (298mm)/12 in (305mm)

WEIGHT

Total, as tested 128 6 oz
 (3,646g)

CHASSIS

Type Stamped plate
Material Hard anodized 3mm
 aluminum

DRIVE TRAIN

Type 4WD shaft driven, 3 diff
Primary Clutch bell/steel
 spur gear
Drive shafts 70/5 aluminum
 (center and rear), universal
 joint (front)
Differentials 0 ring sealed bevel
 gear, 8-gear center diff with
 aluminum housing
Bearing type Rubber sealed

SUSPENSION

Type Pivot-ball
Shocks Aluminum body with
 clip-on preload spacers, bladder
 type volume compensation and
 silicone shaft boots

WHEELS

Type One piece plastic,
 split 5-spoke

TIRES

Type OFNA Fire all purpose tread
 with foam insert

ENGINE AND ACCESSORIES

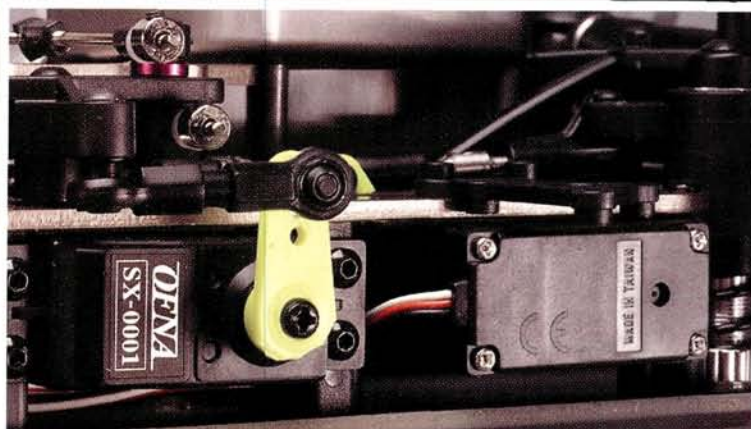
Engine Hyper 21 8 port
Carburetor Plastic body,
 2-needle slide
Fuel tank 125cc with cap
 mounted pressure tap and
 internal filter
Manifold Tubular aluminum
Pipe OFNA aluminum, tuned type

ELECTRONICS

Transmitter OFNA 2 channel
Servos OFNA SX 001



The PCR's included starter box may seem plastic (since it *is* plastic), but it's actually a very solid piece of gear. And since it's custom-fit for Hyper-series buggies, you'll never have to fumble to line up the flywheel and starter wheel.



For once, lying down on the job is a good thing. Mounting the servos on their sides helps lower the Hyper 7 PCR's center of gravity. Unfortunately, the additional bellcrank required for the throttle servo adds weight, but it's still cool.

TRACK TEST OFNA HYPER 7 PCR RTR

Aluminum rear and center dogbones get engine power to the wheels. The 'bones are beautifully polished and superlight, and they should be suitably tough, thanks to their thick 4mm cross-section and 7075 alloy construction. Up front, steel universal-joint axles put the power down without limiting steering action, and rubber-sealed bearings are used throughout. Gotta have those rubber seals. A strong clutch is another gotta-have, and the PCR's 3-shoe, mousetrap-spring model is a standard racing-style unit. Naturally, the clutch bell is steel and is supported by a pair of cartridge bearings.

SUSPENSION AND STEERING. A suspension is only as strong as its shock towers, and at 4mm thick, the PCR's towers are strong indeed. They're home to hard-anodized aluminum shocks with 3.5mm shafts, "nuttet" pistons and clip-adjusted preload—sorry, no threaded collars. The shocks' dual O-ring seals are bottom-loaded and held in with wire snap rings; bladders under the shock caps handle volume compensation. Silicone boots protect the shafts.

The Hyper 7 PCR is based on the "PBS" model ("PBS" stands for pivot-ball suspension). Many buggies use pivot balls to articulate the front suspension, but the PCR gets 'em all around. The setup has a few advantages. Rear toe can be set in any amount without disassembling anything, and front caster can be adjusted by sliding the upper arms fore and aft. You can also use the pivot balls to adjust width; just be careful not to go so wide that the dogbones fall out. The rear suspension uses turnbuckle linkages to set camber, but the steering tie rods are just threaded rod—adjustable, but disassembly is required.

The suspension has a few other clever details. The front upper arms have thick reinforcing rings to



Above: the front suspension components are tough. A reinforcing ring on the upper arm prevents the pivot ball from tearing out, and all the plastic parts are thickly molded and gusseted.

Left: a turnbuckle sets rear camber, and the pivot balls set track and toe—no disassembly required.

prevent the pivot balls from being ripped out in a crash, all the hub carriers have molded-in dirt shields to protect the inboard bearings and drive cups, and a 2mm rear swaybar is standard.

ENGINE AND ACCESSORIES. The PCR includes my favorite OFNA engine: the Hyper .21 8-port. It has four more ports than the standard Hyper powerplant, dual oil grooves in its aluminum piston and a chrome-plated brass sleeve. The heat-sink head now wears a snap-on plastic "helmet" to protect the head from rollover damage, and the carburetor uses the preferred plastic-body construction. If you're not hip to current carb tech, plastic is the material of choice because it doesn't conduct heat well, so the carb stays cooler, and that means the fuel and air going through the carb are cooler, too. A cooler mixture is a denser mixture, and that gives a bigger "bang" when the glow plug sets off the magic of internal combustion. A pull-starter brings the engine to life, but it won't see much action because the PCR includes a starter box (see "Included Electronics & Accessories" for details).



Funny, I can't seem to get Prince's "Raspberry Beret" out of my head. The Hyper .21 8-port engine is a screamer, and its funny little hat protects the heat-sink head from rollover damage. There's a 3-shoe clutch hiding under the clutch bell.

The PCR's engine-support gear is all good stuff. The 125cc tank has a cap-mounted pressure tap and internal "stone" filter. An in-line filter is also supplied; it's neatly strapped to the splashguard that protects the front brake from fuel spills. The air filter is preoiled and neatly tucked beside the engine where an aluminum brace holds it tightly, and the engine mounts are designed so that you can remove and reinstall the engine without having to reset the gear mesh. The exhaust setup is pretty standard for an 1/8-scale buggy: tubular manifold, zip-tied silicone coupler and an aluminum dual-chamber tuned pipe.

BODY, WHEELS AND TIRES. I think the PCR has OFNA's best-looking buggy body yet. The factory graphics are killer (just look at the pics), and the body is completely trimmed, right down to the body-post holes and openings for the fuel tank and engine head. All you have to do is stick on the decals. The wing is pretty trick, too. It fits over bosses molded into the three-position wing mounts, and screws supported by broad countersunk washers squeeze it down. But instead of threading into plastic, the screws thread into Nyloc nuts inserted in the wing mounts. The wing system is bombproof. The wheel and tire setup is first-rate. The "Avenger"

treads include foam inserts and are neatly factory-glued to split-spoke wheels. Does anyone out there miss gluing tires? I didn't think so. The herringbone-ish "Fire" tread design looks like a good match for hard-packed tracks. If you're out for play, the tires should be good all-rounders.

RATING THE OFNA HYPER 7 PCR RTR

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS	The PCR RTR includes a standard Hyper 7 manual with line-art addendums for the PCR features.				
INCLUDED ELECTRONICS	In terms of quality, it's all good stuff. But the steering servo isn't powerful enough for big-buggy duty.				
PARTS FIT & FINISH	That's right; I'm pegging the needle on this one. This is a beautiful buggy.				
ACCELERATION	The 8-port engine rips, the shaft system puts the power down and the Fire treads dig in hard.				
CORNERING ABILITY	It's all about the steering servo. Upgrade to a 100 ounce-incher and bump the score to a solid "very good."				
BUMP & JUMP HANDLING	OFNA dials in the suspension pretty well for rough track and/or play action. Drive hard!				
DURABILITY	No weird wear to report. The hard-ano'd chassis is tough to scuff, and nothing popped.				
ESTIMATED TOP SPEED	48MPH				
BEST BUYER	Any big-buggy fan with a thing for RTRs. It's a bonus if racing is in your future.				

LIKES

- Fantastic factory graphics.
- Raceable 8-port powerplant.
- Includes a starter box, ample tool kit, glow igniter and fuel bottle.

DISLIKES

- No steering turnbuckles—just threaded links.
- Needs a more powerful steering servo.

TEST GEAR

Sidewinder Backyard Basher 20% nitro fuel

Sidewinder's Pro-Race fuel uses 10% lube and the Race blend has 12%, but I reached for the Backyard Basher mix with a whopping 16% lubricant for maximum engine life and lean-run protection. According to Sidewinder, the fuel's "Clean Castor" lube is even more pure than pharmaceutical grade castor (who knew there was such a thing?), the methanol is 99.97% pure, and the nitromethane comes from the supplier used by NHRA drag-racing greats such as John Force, Doug Kalitta and Kenny Bernstein. All I know is that the Hyper 7 PCR liked to drink the stuff.



PERFORMANCE

The PCR dropped onto the starter box and lined up with the starter wheel instantly, as it should; after all, the box is custom-shaped for the Hyper series. The box easily cranked the engine until the carb primed itself, and the Hyper engine snarled to life. I'll fast-forward past the break-in and tuning stuff and get right to the good part: driving wide-open. The PCR's 8-port engine might not be quite as powerful as a purebred Italian powerplant, but that's kind of like comparing a Z06 Corvette's power output to an Enzo Ferrari's; we're talking very powerful versus stupid powerful. Suffice it to say, the Hyper .21 has all the peel-out power you'll ever need for local racing or humiliating the stadium-truck guys. It's also an easygoing engine; it didn't mind extended idling during the photo shoots or less-than-perfect carb settings. But set the needles right, and the engine delivers terrific off-idle responsiveness and a quick trip to a high-rpm powerband payoff.

With a steady wail from the tuned pipe indicating full speed, the Hyper 7 PCR was clearly fast. Our radar gear was tied up with other testing, but I would gauge the all-out top speed to be in the mid- to high 40s, which is pretty typical for a big-engine buggy like the PCR. It's easy to put down speeds like that on pavement, but it's a different story in the dirt, where surplus traction is a rare commodity. Full-power launches on loose dirt resulted in a four-tire roost fest and a little sideways action, but the PCR was easily countersteered to maintain a straight heading. After the big buggy had a few mph behind it, it was hooked up and locked in.

If straight-line speed runs are your thing, you can leave the standard steering servo in place; otherwise, a more powerful servo is in order. Low-speed steering is tolerable, but as speeds get higher and cornering loads increase, the standard servo can't keep up. The PCR's turning radius gets ever wider, and the steering becomes numb. I didn't think it was fair to let the mismatched servo mask the PCR's true handling capabilities, so I popped it out in favor of a Futaba S9451 digital unit with 120 oz.-in. of torque—that's triple the power of the stocker. The new servo transformed the PCR's handling and easily snapped the wheels left and right at any speed.

The buggy has aggressive turn-in, but the Fire tires let it drift wide at mid-turn. Feeding in more steering to compensate led to oversteer, so the PCR railed the turns sprinter-style as I slid the buggy through the turns, with its four tires spraying dirt all the way through. Tighter, slower corners let the PCR's quick handling shine through, and it had plenty of steering for tight-radius moves. High-traction surfaces might overwork the standard-servo-powered brakes, but in the loose stuff, the braking power was enough to set up for the tight sections, and overall brake feel was very good.

The PCR's damping is a little heavier than what I'd run on a rough track, but the big buggy did a good job of staying hooked up nonetheless. In the bumpiest sections, the shocks tended to pack up and made handling a little sketchy, but all it took was a blast of throttle to keep the PCR in the groove. On the plus side, the firm-ish damping also made the PCR a jumping machine, and the shocks easily soaked up big blasts. Given the right tires and the Hyper 7 PCR's total tunability, there shouldn't be any track condition it can't handle.

THE VERDICT

The PCR is unquestionably OFNA's best RTR buggy yet. It has a great engine, lots of features and a very complete set of tools and accessories; you even get a starter box! Straight from the box, the Hyper 7 PCR is easy to run, very fast, fully adjustable and looks killer. Add the right tires for your track and a more powerful servo, and you've got an instant race buggy. If you want to go all the way, you can add an FM radio system and a few select options from the Paul Coleman Racing line.



SOURCES

OFNA RACING (949) 586-2910; ofna.com.

SIDEWINDER FUELS distributed by Morgan Fuel (800) 633-7556 morganfuel.com.

Kyosho Mini-Z Monster

KYOSHO HAS CERTAINLY LED THE WAY in the sub- $\frac{1}{12}$ -scale RC car scene with its popular Mini-Z line, which was expanded to include off-road vehicles with the Mini-Z Overland series. The SUV-style Overlands are undeniably cool, but for go-anywhere, crush-whatever-gets-in-your-way action, only a monster truck will do. With exactly that sort of driving in mind, Kyosho has unleashed the Mini-Z Monster. Now, big-wheel aficionados can get into the micro scene with a handheld monster that amplifies the suspension articulation of the Overland, adds mighty monster truck tires to the mix and is topped off with Mad Force bodywork—all fully painted and ready to run, of course.





LITTLE BIG TRUCK

KIT FEATURES

CHASSIS. The Mini-Z Monster's chassis layout is similar to that of its close cousin, the Overland. The main component is a molded frame piece that secures 2, AAA batteries on each side. When viewed from underneath, the main chassis piece looks like an "H." Instead of leaving the batteries exposed, which would completely ruin the scale appearance of the little car crusher, Kyosho fashioned oversize, chromed "gas tanks" to cover the cells. This is appropriate because the batteries are the "gas" for this mini electric. When the batteries are removed, the wheelbase can be adjusted to different lengths, just like on the other Mini-Zs.

On top of the main chassis and spanning the battery holders are the plastic body and upper suspension mounts. Other than the cosmetic battery covers, these two pieces are the main difference between the Mini-Z Monster's chassis design and the Overland's.

The Monster's integrated electronics are on top of the chassis. The receiver and speed control are in one unit, and the servo rides on the front axle.

DRIVE TRAIN. The Mini-Z Monster is 2WD and uses a metal rear axle. To provide the torque needed for off-road, a 3-gear gearbox is used as a reduction unit. The primary ratio of 4.4:1 is reduced to a more powerful 22:1 by the time the three gears do their work, and that more than makes up for the big tires the 130 motor has to turn. The gearing isn't fixed, so if you favor even more grunt or have a need for speed, Kyosho includes three extra pinions to get the job done (9T, 11T and 12T).



The Mini-Z Monster uses a 3-gear drive train and four bevel gears in the differential. On the right of this photo, the small, 10-tooth pinion that spins the spur gear is visible. The larger spur has a small, molded-in intermediary gear that spins the lower drive gear that is part of the differential housing.

The entire transmission is mounted off the chassis and is part of the rear suspended axle. The motor is mounted behind the axle, and the gearbox makes up the left side of the axle housing. The differential protrudes from the enclosed gearbox, and although this prevents the gears from being completely sealed, the design does allow easy access to the differential. This ready access means you can insert the included and rather ingenious diff-locking plate in only seconds. Just remove the left rear wheel to drop in the plate, and you'll go from a freely spinning diff to a high-traction, fully locked diff. The diff works via four plastic bevel gears and provides smooth, fast action when the diff-locking plate isn't installed.

SUSPENSION AND STEERING. The multi-link setup consists of a lower swing plate that's hinged at the chassis and secured with a ball stud at the axle housing. From the top, twin upper links connect each axle housing to the chassis, and both ends of the truck have two coil-over units. This design yields very impressive suspension articulation because the axle can swing up and down and twist laterally.

The key to the freely moving suspension lies in the use of a ball stud at the axle end of the lower swing plate. A ball stud is used at each end of the four suspension links up top. The ball studs allow the suspension components to pivot through a wide range of motion, and that contributes to the Mini-Z Monster's great handling and rough-terrain capabilities.

At first glance, you might think the Mini-Z Monster and the Overland share the same suspension, but the Monster has longer axle housings to create that monster-truck stance.

BODY, WHEELS AND TIRES. The included body is an injection-molded, hard-plastic shell that comes fully painted and beautifully detailed. Kyosho adds a deep gloss coat that not only adds to the looks but also protects the finish and decals; it is so thick that the edges of the decals almost disappear. A chrome grill and cab spoiler further dress up the truck, as do the deeply tinted windows that look better and more realistic than black-painted windows. The paint job is a multicolored screen-printed design offered in two schemes. The black tonneau cover and the window moldings are painted. The more you look at this Mini-Z's shell, the more details you'll find—such as the painted fog lamps and lower grill work.

The one-piece wheels have the same bright chrome plating as some of the other accessories. The tires are almost 2 inches tall, which is substantial, given the scale of this little truck. They have the classic chevron monster truck treads and there's no need for foam inserts; overall, these tires are soft and pliable and dish out good all-terrain traction.

INCLUDED ELECTRONICS & ACCESSORIES

KYOSHO PERFEX KT-5 PISTOL-GRIP TRANSMITTER

The well-respected electronics manufacturer, KO Propo, designed this 2-channel, 27MHz AM radio. It features throttle and steering trims as well as steering dual-rate. The steering trim is positioned above the steering wheel, and the throttle trim and dual-rate servos are hidden behind the removable tuning panel to the left of the wheel. The power LED not only shows when the radio is on, but it also serves as a low-battery warning by turning yellow when battery levels aren't sufficient.



INTEGRATED ESC/RECEIVER UNIT

The Mini-Z Monster relies on a combination unit that incorporates both the receiver and the electronic speed control in one package. Replaceable 27MHz crystals are used, and a small length of piano wire grabs signals from the transmitter. The throttle feels very smooth, and the system is truly digitally proportional. The servo motor is incorporated into the front axle housing, and it, too, yields a smooth, proportional feel. The Mini-Z Monster uses the same upgraded electronics as the Mini-Z F1 and MR-02; they incorporate reverse and brake.

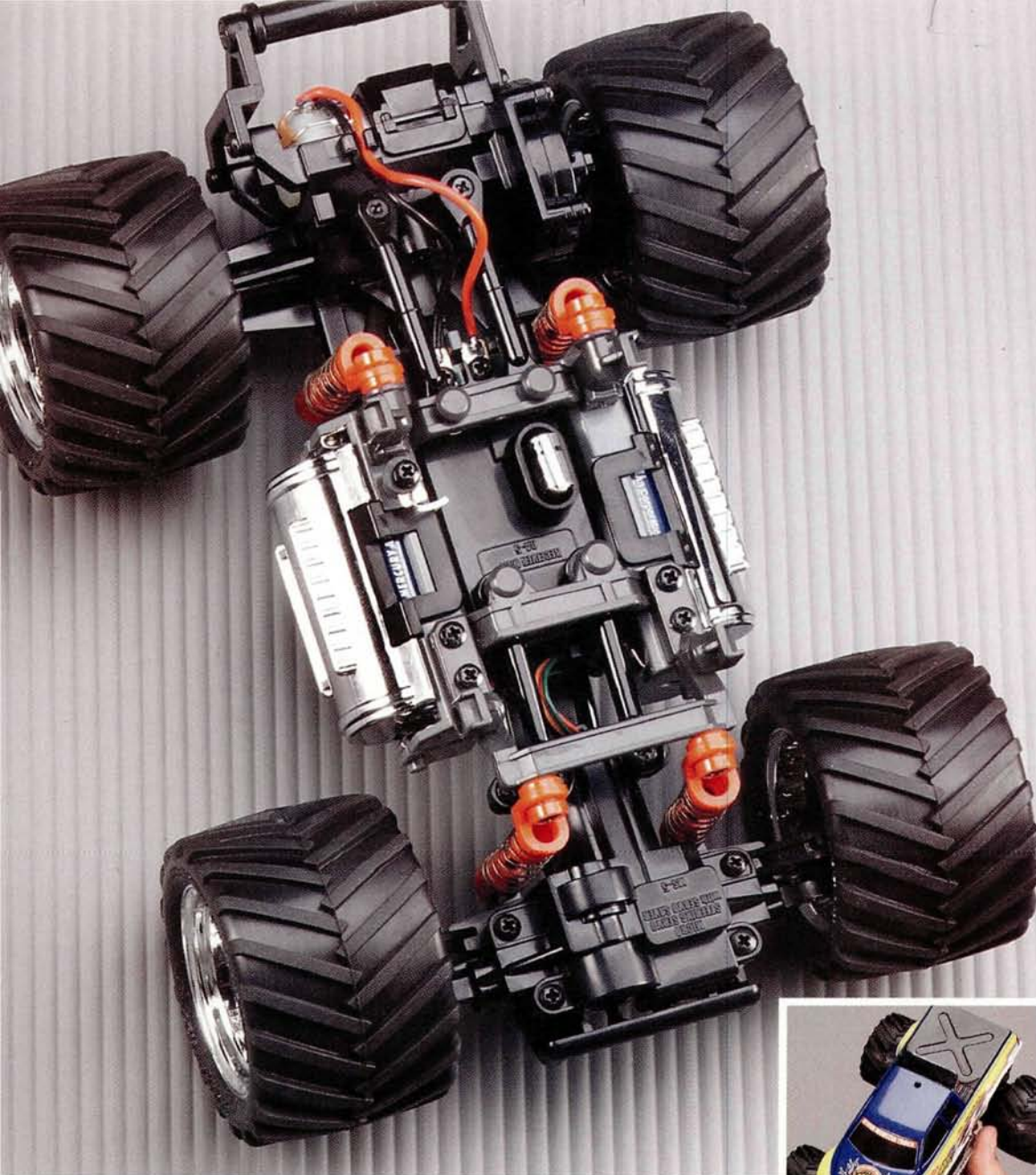
TOOLS Kyosho includes two small tools to help you work on the Monster: a small lever to remove pinions, and a wheel wrench. The parts tree that contains the diff-locking plate also holds a few extra wheel nuts and plastic clips.

you'll need

- 4, AAA alkaline or rechargeable batteries
- 8, AA alkaline or rechargeable batteries

factory options

- Ball-bearing set—item no. MMW01
 - Stainless-steel rear shaft set—MMW02
 - Spring set (S/M/H)—MVW02
 - Oil-shock set (F/R)—MVW05/MVW06
 - X-Speed Mini-Z Motor V—MZW8V
 - SP servo-gear set (Delrin)—MZW23
 - Screw kits (blue/red)—MMF01BL/MMF01R
 - Skeleton chassis set (clear/clear blue/clear purple/clear green) MMF02C/MMF02CB/MMF02CP/MMF02CG
 - Skeleton servo-case set (clear/clear blue/clear purple/clear green)—MMF03C/MMF03CB/MMF03CP/MMF03CG
 - Accessory light set III (slim type)—MZW31
- Partial list; many more option parts available.



SPECIFICATIONS

MANUFACTURER Kyosho
MODEL Mini-Z Monster
DISTRIBUTED BY Great Planes Model Distributors

SCALE 1/30
PRICE \$180
Price varies with dealer

DIMENSIONS
Wheelbase 4.1 in. (105mm)
Width 5 in. (127mm)

WEIGHT
Total, as tested 10 oz. (285g)

CHASSIS
Type Molded one-piece main frame with integrated electronics
Material Plastic

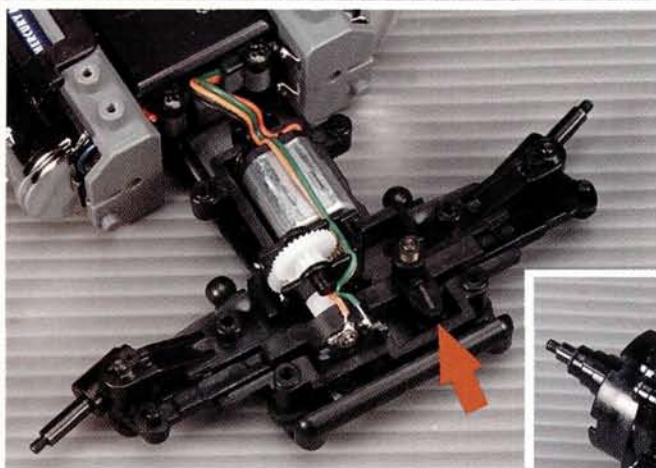
DRIVE TRAIN
Type Enclosed 3-gear gearbox with solid rear axle
Primary 10T pinion/44T spur gear
Transmission ratio 5:1
Final drive ratio 22:1
Drive shafts Solid metal axle
Differentials Plastic bevel gear
Bearing type Plastic bushings

SUSPENSION
Type (F/R) Multi-link swing-arm
Shocks Undamped coil-over

WHEELS
Type One-piece chromed plastic

TIRES
Type Soft-rubber, chevron, directional, monster truck treads

ELECTRONICS
Transmitter Kyosho Perflex KT-5 pistol-grip radio
ESC Kyosho RA-5 integrated ESC/receiver
Servo Kyosho MS-5 micro steering servo w/servo-server



Above: with the top of the front axle housing removed, you can see the servo motor. The steering system is a rack-and-pinion setup that even incorporates a servo-saver (arrowed). At the front of the axle housing, is a small sensor that detects the position of the servo and sends the information to the servo circuitry that's housed in the integrated electronics unit.

Below: the rear axle housing and suspension incorporate the gearbox, diff and motor into one unit. Check out the wheelie bar.



Above: to lock the diff and dramatically increase traction, all you have to do is remove the left rear wheel and slide on the diff-locking plate.

PERFORMANCE

It doesn't take long to get the Mini-Z Monster out of the box and running; just install the batteries in the transmitter and the truck, and you're ready to go. The first thing I noticed about the little Monster is that it's nearly impossible to flip it. This truck corners hard and digs in, but the suspension works so well that it easily handles all the wheel cranking you can throw at it. The steering is also surprisingly quick; the little servo has no trouble moving the big wheels fast.

Acceleration is pretty impressive with the low gearing, and off the line, the monster can even keep pace with a Mini-Z MR-02, but it eventually succumbs to that car's higher top speed. As expected, the car is faster, but not by all that much. In stock form, the Mini-Z Monster can put 10.4mph on the radar—not bad at all. It can't pull wheelies from a dead stop, but if you pop the truck forward from reverse, the rapid change of direction brings the wheels right up.

Although it isn't recommended, I took the Monster outside and bashed around in some really dusty, dirty areas. When I installed the diff-locking plate, it dramatically improved traction. Where a stock, open-diff-equipped Monster got hung up, my diff-locked Mini-Z Monster plowed right through.

On the dirt, the turning radius wasn't hampered by the locked diff because of the loose surface, but inside, on carpet, that modification increased the turning radius. This is hardly an issue because the plate is so easy to install and remove. After the dirt-running session, I took the drive train apart and found some wear on the gears where fine dirt particles had snuck in. Nothing was broken (or even close to it), but a quick cleaning was in order to spare the gears from having to endure further wear. I also disassembled the shocks and ran a pipe cleaner through them because they were binding because of dirt contamination. If you disregard Kyosho's warning not to run this truck in loose

dirt, I suggest that you perform the same maintenance, too.

I tested the Mini-Z Monster outdoors, indoors and on all sorts of off-road terrain, and the truck did well in every situation. The generous approach and departure angles and its great suspension allow the truck to traverse all sorts of obstacles. It will bog down on really steep hills, but I was surprised at what it went up. Also, when a climb proved to be too much, reverse was right there to take it back down, and you can have another try at it.

One of the best things to do with a monster truck is to jump, and this is where Kyosho's tiny truck really shines. The Mini-Z Monster jumps smooth and level, and just like a cat, it always lands on its feet. I made jump after jump—each bigger than the last—and the Mini-Z Monster took every airborne trip in stride.

THE VERDICT

The Kyosho Mini-Z Monster is a superb truck. It looks great, comes ready to run, and performs exceptionally well. The suspension is one of the most functional designs I have ever seen; this truck is fun to just hold and work the suspension. Although the price might seem high, the quality is there to warrant it, and the Mini-Z Monster will allow RC monster trucks to go where they have always been too big to go before. Kyosho has created a new category in RC, and the Mini-Z Monster will be a tough act to follow.

LIKES

- > Scale realism and good looks.
- > Well-articulated suspension.
- > Complete, ready-to-run package.

DISLIKES

- > Gearbox is enclosed but not sealed.
- > People want to use it all the time.



RATING THE KYOSHO MINI-Z MONSTER

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS	Excellent, comprehensive instructions with plenty of informative illustrations.				
INCLUDED ELECTRONICS	High-quality transmitter with all the right features.				
PARTS FIT AND FINISH	Everything fits as it should, and the Mini-Z Monster is perfectly assembled.				
ACCELERATION	Low gearing provides strong—but not ballistic—launches.				
CORNERING ABILITY	Superb cornering stability.				
BUMP & JUMP HANDLING	Fantastic jumper and great bump handling.				
DURABILITY	When subjected to dirt, the gears did show wear.				

RADAR TESTED TOP SPEED 10.4MPH

BEST BUYER Anyone who wants a monster truck that can be run almost anywhere.

SOURCES

KYOSHO distributed by
Great Planes Model Distributors
(217) 398-6300;
(800) 682-8948;
kyosho.com.

Technokit TKT99J

GIANT, 1/5-SCALE RC RACE CARS are well-known for their big engines, big speeds and big realism, but these, unfortunately, also come at a big price. Technokit has come to the rescue with its TKT99J—a 1/5-scale car that's within the reach of us mere mortals with slightly smaller pockets; at \$700, this just might be the best bargain in RC! The Italian-engineered and assembled entry-level model is made with many of the same exotic materials and components as are used on Technokit's full competition-level cars. When you're ready to step up the TKT99J's performance, you can bolt on the go-fast gear that's used on the higher-level cars. And don't think for a minute that the TKT99J is de-tuned; a Zenoah G23RC engine powers it and produces more than 4hp—enough juice to propel the 20-pound car to nearly 50mph. It even comes factory-built; with only the radio to install and the body to paint, you'll soon be ready for some large-scale fun.



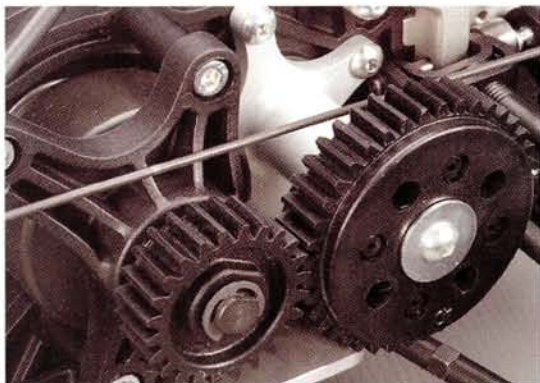


The Italian Job

KIT FEATURES

CHASSIS. The huge, 4mm-thick chassis plate is made out of Ergal 7075 T6 aluminum (an extra-strong aluminum alloy). Its sides are radiused to keep the chassis as stiff as possible, especially because it doesn't have an upper deck to provide extra support. All of the components are mounted on the chassis with countersunk hardware so that the chassis' underside is kept smooth. An opening below the differential allows it to be mounted low on the chassis, and just ahead of the engine is a small hole where the exhaust exits.

DRIVE TRAIN. The 2WD drive train has an uncomplicated and efficient design. The 24T clutch bell meets a layshaft that has a 40T spur gear on one end and a 15T reduction gear at the other end; this reduction gear, in turn, meshes with the 48T metal diff gear. The planetary gear diff is made



The gears used in the transmission are robust and can easily handle the power of the 22.5cc Zenoah engine.

of metal and is filled with very thick grease to reduce diff action. Thick, steel dogbones relay the power from the diff to the wheels. Metal-shielded ball bearings keep the diff spinning true, and the rear hub carriers and front axles have rubber-sealed bearings. A thick, fiber disc brake is keyed onto the diff, and cam-activated steel calipers squeeze the disc to bring the car to a stop.

ENGINE AND ACCESSORIES. The Zenoah G230RC is the same engine as the one Technokit installs in its competition vehicles. With a 22.5cc displacement and dual-needle carb, it has a claimed output of around 4.5hp. The engine comes with a factory-set carb, so it requires little, if any, tweak-

ing, according to Technokit. Testing will validate this claim. A foam element air filter keeps clean air flowing into the carb, and a canister-type muffler takes care of the exhaust. Unlike a nitro engine, the Zenoah doesn't need a glow igniter to fire it up. Just give a yank on the pull-starter and it starts. Simple. A primer bulb that's fitted on the side of the carb makes it easy to start the flow of fuel into the engine. A 700cc fuel tank sits on the chassis just ahead of the engine. Inside the tank, there's a fuel filter that's installed at the end of the fuel-line pick-up so contaminants won't reach the engine.

SUSPENSION AND STEERING. The TKT99J uses independent front and rear suspensions with large friction shocks at each corner to smooth out the bumps. Stiff springs are spec'd on the rear, and softer ones are up front for improved cornering ability. The upper and lower front A-arms are almost identical; the only difference is that the bottom arms are fitted with droop screws to limit downtravel. Camber and toe angles are adjusted by steel turnbuckles, and caster can also be altered by loosening two setscrews and sliding the A-arm fore and aft. The front shock tower seems weak; it's made of two pieces of thin-gauge steel that are sandwiched together and flex slightly when the suspension is compressed. The rear end has a different setup: the lower arm is made of two steel turnbuckles that are attached to the chassis with large swivel ball links, and the upper link is a single turnbuckle.

The chassis is set up to use a 1/4-scale steering servo. It is mounted inverted and fitted with dual control arms for a push-pull setup. A single bellcrank is rigged with a non-adjustable spring that will save the servo in a crash. Heavy-duty, adjustable steering links connect the steering knuckles to create a superstrong steering arrangement.

BODY, WHEELS AND TIRES. The Technokit TKT99J is available with a choice of four bodies: a Mercedes CLK DTM (used for this track test), an Opel Astra DTM, a Honda Accord and a Subaru Impreza WRC. The bodies come clear, so you can lay down your own custom paint job, and a decal sheet is included.

Thankfully, the wheels and tires are mounted and securely glued for you. The white, plastic, multi-spoke wheels have a scale appearance and feature a metal collar that reinforces the area where the wheel hub is keyed onto the wheel. For maximum traction, the rear tires are made of a softer compound than the compound used for the front tires. It's hard to tell just by touch, but they are different.

BUILDING & SETUP TIPS

The TKT99J comes out of the box 75 percent assembled with only a couple steps left to complete the car. These tips will help you the rest of the way:

RECEIVER BATTERY PACK. These 1/5-scale cars are set up to race for approximately 35 minutes on a single tank of fuel (a 5-minute warmup and then 30 minutes of racing). This run time with power-hungry servos demands the use of a high-capacity receiver battery pack. I used a DuraTrax 6V 1100mAh receiver battery pack that will last longer and provide more power for the servos than a typical receiver pack, but you could also use a 5-cell sub-C pack with 3300mAh.

RADIO SYSTEM. So, you've invested in a 1/5-scale gas car, and now isn't the time to skimp on a radio system. Be sure to pick up a decent FM radio system that will provide clear signals between the transmitter and receiver.

STEERING AND THROTTLE SERVO. High-quality steering and throttle servos are just as important as the radio system. They need to be strong enough to control an RC car that is seven times heavier than a typical 1/10-scale touring car. A servo of standard size that actuates the throttle and brakes

should have roughly 100 oz.-in. of torque. This will ensure there's enough muscle behind the brakes to bring the car to a stop during an emergency. A big, 1/4-scale servo is normally spec'd to handle the steering servo. Hitec has the HS-755HB servo, JR Racing has the 615 FET; and Futaba has the S5302, which I used on the TKT99J.

WHEEL MOD. Every once in a while, parts don't fit correctly and modification is necessary. For instance, one of the wheels that came with my kit didn't fit the axle because the axle hole wasn't big enough. I simply corrected this by using a 5/16-inch drill bit to enlarge the hole in the wheel so that it would slide onto the axle.

STEERING LINKAGES. The included steering linkages that connect the servo to the bellcrank were too short, so I picked up two, 2-inch titanium turnbuckles from Lunsford and fitted them with Du-Bro's swivel ball links to make new linkages.

THROTTLE/BRAKE-SERVO INSTALLATION.

The mounting location for the throttle/brake servo was too large to hold a servo of standard size. I made two small rectangular supports out of scrap graphite, bolted one on either side of the opening for the servo and then screwed the servo onto the new supports.

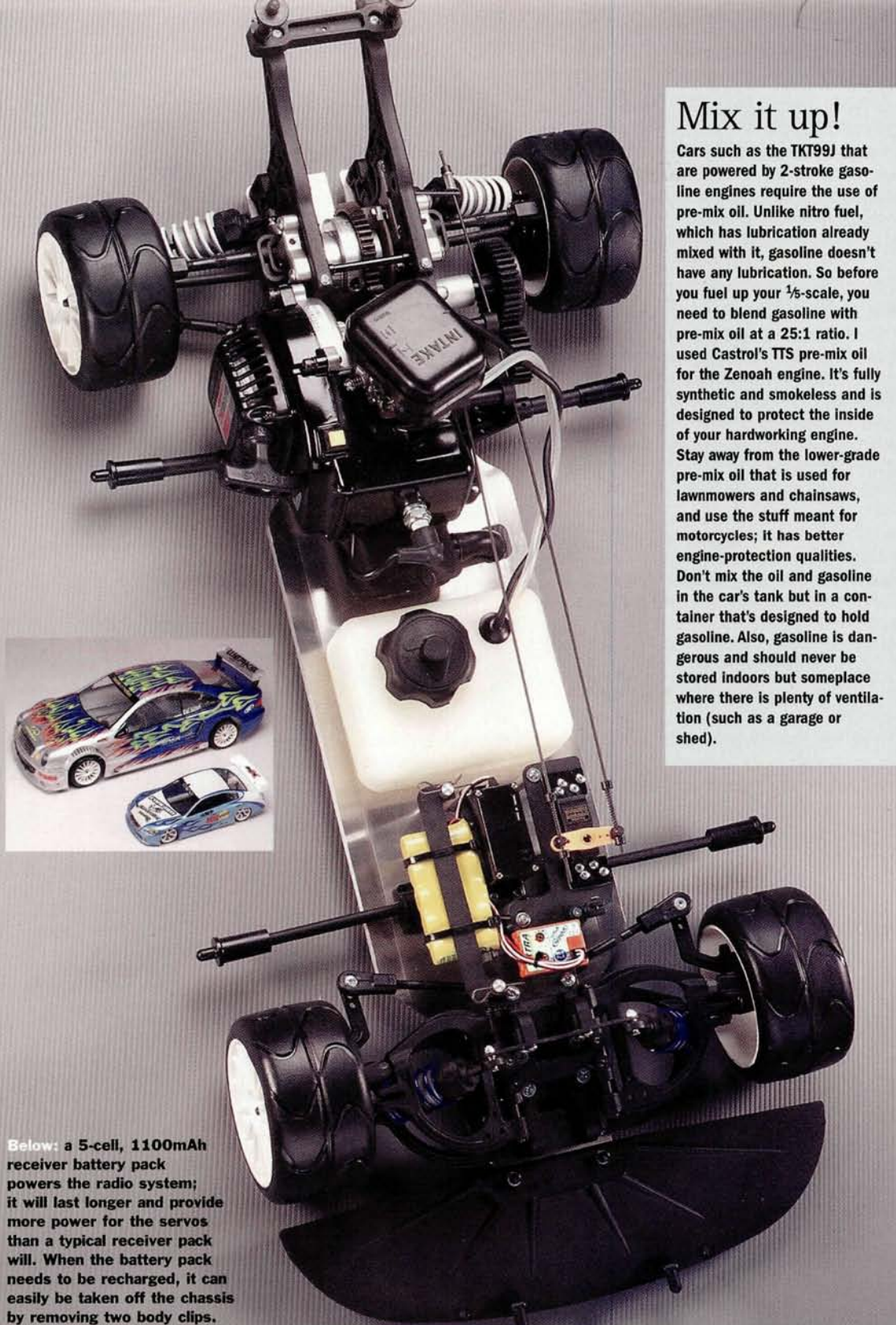
you'll need

- Transmitter and receiver
- 1/4-scale steering servo
- Standard throttle servo
- 5-cell, high-capacity receiver battery pack
- 2-stroke pre-mix oil
- Gasoline
- Gas can
- Polycarbonate-friendly paint

factory options

- Cup brake sets (F/R)—item no. 51448/52022
- 3-chamber exhaust pipe—51204
- Swaybar kit—51449
- Titanium lightening kit—51458
- Carbon-fiber radio tray—51023
- Carbon-fiber shock tower—51228
- Carbon-fiber wing, Mercedes CLK body—51621

Partial list; additional parts available

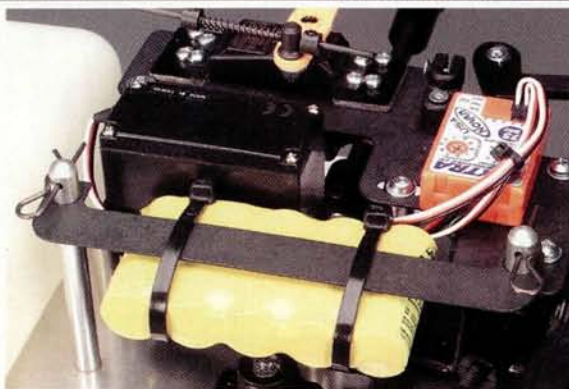


Mix it up!

Cars such as the TKT99J that are powered by 2-stroke gasoline engines require the use of pre-mix oil. Unlike nitro fuel, which has lubrication already mixed with it, gasoline doesn't have any lubrication. So before you fuel up your 1/5-scale, you need to blend gasoline with pre-mix oil at a 25:1 ratio. I used Castrol's TTS pre-mix oil for the Zenoah engine. It's fully synthetic and smokeless and is designed to protect the inside of your hardworking engine. Stay away from the lower-grade pre-mix oil that is used for lawnmowers and chainsaws, and use the stuff meant for motorcycles; it has better engine-protection qualities. Don't mix the oil and gasoline in the car's tank but in a container that's designed to hold gasoline. Also, gasoline is dangerous and should never be stored indoors but someplace where there is plenty of ventilation (such as a garage or shed).



Below: a 5-cell, 1100mAh receiver battery pack powers the radio system; it will last longer and provide more power for the servos than a typical receiver pack will. When the battery pack needs to be recharged, it can easily be taken off the chassis by removing two body clips.



Above: the all-metal, grease-filled planetary diff is built solidly to withstand the extreme forces that these large cars encounter. A thick, fiber disc brake (arrowed) is keyed onto the diff, and cam-activated steel calipers squeeze the disc to bring the Technokit to a stop.

SPECIFICATIONS

MANUFACTURER Technokit
MODEL TKT99J
DISTRIBUTED BY Werks Racing

SCALE 1/5
PRICE \$700
Varies with dealer

DIMENSIONS
Wheelbase 21.14 in. (537mm)
Width 15.16 in. (385mm)

WEIGHT
Total, as tested 20.7 lb. (9,404g)

CHASSIS
Type One-piece plate with radiused sides
Material 4mm, Ergal 7075 T6 aluminum

DRIVE TRAIN
Type Exposed 2WD gear drive
Primary 24T clutch bell/40T spur gear
Transmission ratio 3.2:1
Final drive ratio 5.34:1
Drive shafts Steel dogbones
Differentials Metal planetary gear
Bearing type Metal-shielded and rubber-sealed ball bearings

SUSPENSION
Type (F/R) Dual A-arm/dual lower adjustable links with adjustable upper camber link
Shocks Aluminum-body, friction coil-overs

WHEELS
Type One-piece, white, multi-spoke

TIRES
Type Preglued with racing tread

ENGINE AND ACCESSORIES
Engine Zenoah G230RC 22.5cc
Starter Pull-start
Carb Walbro twin-needle with primer bulb
Exhaust Canister-type
Tank 700cc with threaded cap and built-in fuel filter

Below: the friction shocks are massive and provide plenty of damping for the heavy chassis. Note that the wheel hub uses two setscrews to hold it in place for extra security.



PERFORMANCE

I seldom get the opportunity to drive large-scale gas cars, so I looked forward to the Technokit TKT99J's first run. I found the perfect place for testing: a wide-open parking lot. The Zenoah engine fired right up once it had been properly primed with fuel. The engine easily maintained its idle and didn't require any adjustment to the carb. I attached the body, grabbed the transmitter and squeezed the trigger. It's at this point, that a 1/5-scale car will hook you. The ultra-deep rumble that its engine makes is absolutely awesome. The tires spun when leaving the line, and the car shot across the parking lot. As it headed into the first turn, the rear end broke loose and the Mercedes looped out. Then I remembered that the tires on these cars have to be brought up to temperature just like those on real race cars. After I had driven around for a few minutes, the tires hooked up much better, and I was able to attack the corners more aggressively and not have the rear end come around. This doesn't mean you can stay full-clamp in a turn, but you can hold more speed with the tires warmed up. Typical of rear-wheel drive vehicles, the TKT99J has an understeer characteristic, meaning the car wants to push in the corners. This is much more forgiving than oversteer. I also found that if you continuously drive the car hard, the tires can be overheated and will lose traction. If you back off, the tires will cool, and you'll be back in business.

Confident that the TKT99J was running at its optimum performance level, I sent it in front of the radar gun to check its top speed. The Mercedes CLK clicked off a very fast top speed of 49mph. This isn't much slower than the speeds competition cars reach, and this is an entry-level vehicle—sweet! At speed, the car tracks perfectly straight, and it was easy to keep it under control. Getting the heavy car to slow down was not as easy. The single disc brake struggles to slow the car to a stop, and the car eats up plenty of pavement in the process; as long as you keep this in mind, you won't have any problems.

After I had run the Technokit for a while, the engine just quit on me. I removed the body and saw the problem: no fuel. I looked at my watch; the car had run for about 35 minutes on only one tank of gas. When you consider the higher cost of nitro fuel compared with the cost of pump gasoline, you realize that this car is relatively cheap to run. I inspected the car while I had the body off and didn't find any unusual wear or breakage—just a couple of loosened screws.

THE VERDICT

The Technokit TKT99J delivers on the "cool" and "fun" factors. Once you've experienced the incredible sound of a 1/5-scale gas car and seen it perform on a track, you'll understand its allure. The car is easy to run, has a reliable gas engine that propels it to amazingly high speeds, and it's built solidly to withstand abuse. It's much cheaper than many other 1/5-scales, so you can at last get your feet wet in this large-scale class. As your driving skills improve, the car can "grow" with you.



RATING THE TAMIYA TB EVOLUTION III SURIKARN LIMITED

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS NOT AVAILABLE	Works Racing is putting together a detailed instruction manual that will come with the TKT99J, but it was not ready at presstime.				
PARTS FIT AND FINISH	The car is very well built and didn't require extra attention.				
CORNERING ABILITY	Like most 2WD vehicles, the TKT99J exhibited understeer that improved when the tires came up to temperature.				
ACCELERATION	Although the Zenoah has a claimed 4hp+, the heavy car doesn't move out very quickly.				
DURABILITY	No unexpected wear or breakage except for a couple of loose screws.				
RADAR TESTED TOP SPEED	49MPH*				
BEST BUYER	Intermediate to advanced RC enthusiasts who are looking for big-scale excitement.				

* Top speed varies with operating conditions.

SOURCES

DU-BRO PRODUCTS (800) 848-9411; dubro.com.

DURATRAX distributed by Great Planes Model Distributors; duratrax.com.

FUTABA distributed exclusively by Great Planes Model Distributors; futaba-rc.com.

GREAT PLANES MODEL DISTRIBUTORS (217) 398-6300; (800) 682-8948; greatplanes.com.

LUNSFORD RACING (541) 928-0587; lunsfordracing.com.

NOVAK ELECTRONICS INC. (949) 833-8873; Teamnovak.com.

WORKS RACING (408) 365-1000; worksracing.com.

LIKES

- > Looks and sounds cool.
- > Heavy-duty construction.
- > Long run time on one tank of gas.

DISLIKES

- > Needs more stopping power.
- > Requires large area to run.

TEST GEAR



Futaba S5302 high-speed 1/4-scale servo

Cars such as the TKT99J require a steering servo that can withstand the force required to turn the large 4.5-inch-diameter tires. Futaba's S5302 1/4-scale servo easily handles the steering. It features 236 oz.-in. of torque at 6 volts and a transit time of 0.15 second. Dual ball bearings and metal gears make this servo a well-rounded performer.

Additional items used to complete the TKT99J



Futaba 3PDF transmitter

Novak XXtra synthesized receiver

Futaba S9402 high-speed coreless BB servo

DuraTrax Ni-Cd 6V 1100mAh receiver battery pack



tracktest >>>

1/18 4WD MICRO TOURING CAR
SCALE BY GEORGE M. GONZALEZ

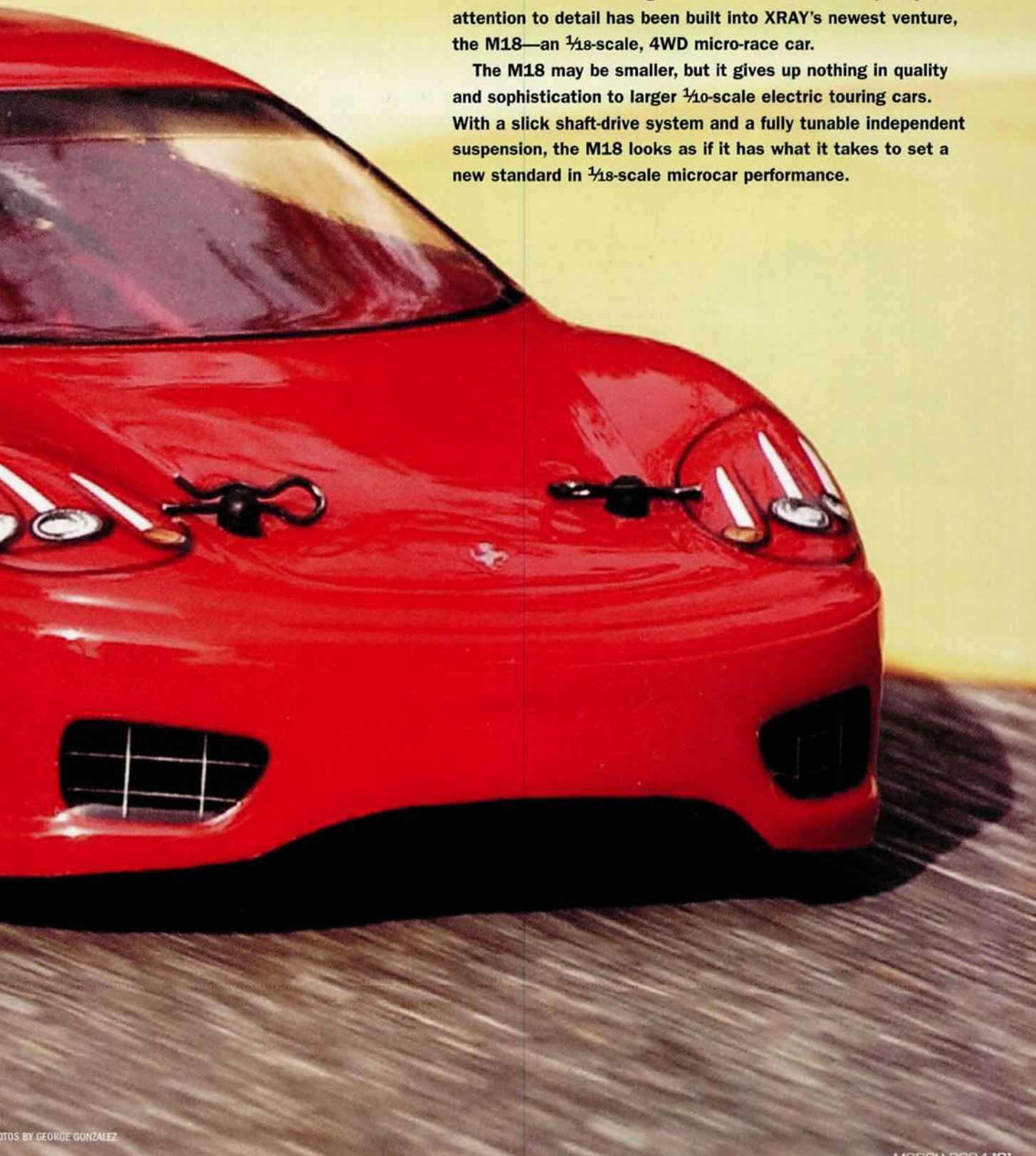


SMALL SIZE,
BIG
PERFORMANCE

XRAY M18

SINCE COINING THE TERM “LUXURY TOURER” with the superbly crafted T1 back in 2002, XRAY has built a reputation for manufacturing some of the highest-quality, best-finished $\frac{1}{10}$ -scale electric touring cars available. The same quality and attention to detail has been built into XRAY's newest venture, the M18—an $\frac{1}{18}$ -scale, 4WD micro-race car.

The M18 may be smaller, but it gives up nothing in quality and sophistication to larger $\frac{1}{10}$ -scale electric touring cars. With a slick shaft-drive system and a fully tunable independent suspension, the M18 looks as if it has what it takes to set a new standard in $\frac{1}{18}$ -scale microcar performance.



KIT FEATURES

CHASSIS. The M18's flat plate chassis is molded out of composite plastic. A molded-in center spine increases chassis stiffness, and a long, molded rod that is attached to the front and rear gearboxes also aids in the chassis-rigidity department. The completed chassis is very rigid from front to back, but a slight side-to-side lateral flex makes the car handle more forgivingly on loose surfaces.

A molded bumper with a foam body protector is included, and a battery strap that's held to the chassis with body clips secures the 5-cell battery pack and makes battery swaps a snap. An optional saddle-pack chassis allows you to mount the batteries in either a 3x2 (5-cell) or 3x3 (6-cell) configuration, and it includes a special motor mount that positions the motor above the spur gear to make room for the batteries. With some Shoe-Goo and a little imagination, however, you can easily install 6 cells on the stock chassis.

DRIVE TRAIN. The M18's simple shaft-drive system makes it easy to build and maintain, and it provides quick acceleration. An aluminum center-propeller shaft links the front and rear diffs to provide full-time 4WD. The bevel-gear diffs are easy to build and amazingly smooth. Each bevel-gear diff is secured with spring-loaded diff screws that allow you to adjust its tension externally with the included square-head wrench. A 36T, 48-pitch



Simple and efficient is the name of the game when it comes to the M18's drive train. An aluminum propeller shaft links the adjustable bevel gear diffs, and the drive train spins smoothly on metal-shielded ball bearings.

spur gear is attached to the rear pinion-gear shaft, and four pinion gears (17T, 19T, 21T and 23T) are included to help you gear the M18 for your particular motor and track. The pinion gears are nicely molded and have setscrews to keep them attached securely to the motor shaft. The motor is mounted on a 2-piece sliding mount that allows you to adjust gear mesh by simply loosening two screws under the chassis and sliding it up against the spur gear. It's a nice system; my only gripe is that the motor mount is plastic, so it doesn't dissipate heat very well. An aluminum motor mount would be preferred, especially if you run high-amp draw motors and 6-cell battery packs. Fortunately, XRAY offers several aluminum-motor-mount options.

Plastic, universal-joint drive shafts spin all four wheels, and the dog-bones and yokes (but not the axles) are compatible with the Micro RS4's front universal axles (nice to know, in case you break one and don't have an XRAY dealer nearby). Sixteen metal-shielded ball bearings keep the drive train spinning smoothly. The M18's drive train is so friction-free that you can literally make the tires spin just by blowing on the spur gear.

SUSPENSION AND STEERING. The upper and lower wishbones pivot on flanged bushings for ultra-smooth action—no hinge pins to bend or E-clips to lose. The M18's completely independent suspension uses a simple cantilever shock system. The friction shocks aren't fluid-filled, but applying grease to the shock shafts provides damping. The shocks feel surprisingly smooth even without grease, though. Large-diameter shock springs improve the car's handling by providing the proper ride height and allowing a slight "sag" in the suspension. Although the top mounts are fixed, the shocks have two lower mounting positions for additional track tuning; you can easily change their positions without tools.

The front steering knuckles are identical to the those in the rear; with

optional turnbuckles, front and rear toe adjustment is possible. Fixed links are provided, and they provide 0.5 degree of front toe-out and 2.5 degrees of rear toe-in. A simple pushrod steering system provides equal left and right steering throw. The steering system consists of only two links: a tie rod that connects the servo's output arm to the left steering knuckle and a center link that connects the two knuckles so that the wheels turn in unison. Additionally, the front upper suspension arms provide 12 degrees of caster to improve handling.

BODY, WHEELS AND TIRES. A Pro-Line 360 Modena body is included with the M18. This is a nice-looking and great-handling 150mm, 1/18-scale body. It comes with window masks and overspray film for easy painting and flexible decals for body detailing. Be sure to read the "Building and Setup Tips" for instructions on how to mount the body properly. I painted mine with Pactra Bright Red and the wing, Outlaw Black—a simple paint scheme indeed, but most Ferraris are red anyway.

The M18 uses a two-piece, inner and outer wheel system that's compatible with the Micro RS4, so you can take advantage of all its wheel and tire options. The M18 includes nice-looking, white, split-spoke outer wheels and medium-hard-compound slick tires with stick-on inserts. Two front and rear width options are available, depending on how you mount the outer wheels on the inner wheels: 98 or 101mm (front) and 104 or 107mm (rear).

BUILDING & SETUP TIPS

The M18 is easy to build, thanks to the individual parts bags that contain all of the parts and fasteners to complete each series of steps and also to the excellent instructions with 3D illustrations. Take your time when you build the kit and follow the instructions to the letter. Here are a few tips that will make the assembly process go even more smoothly.

PAGE 4, STEP 3 AND PAGE

7, STEP 3 Tighten the rear diff's tension screw so that the diff spins freely without any resistance. Set the front diff's tension a little tighter so that you feel a little resistance when you rotate one of the front wheels.

PAGE 10, STEP 3 AND PAGE

16, STEP 3 Pay attention when you press the pivot balls into the openings on the suspension arms. Some of the pivot balls have flanges and some do not. Install two flanged pivot balls (flange side down) in the openings on the inside of the suspension arms and one non-flanged pivot ball (large opening facing up) in the opening on the outer suspension arms.

PAGE 23, STEP 5 Don't install the plastic shim (preload spacer) on the front shocks as the instructions direct you to do; slide them over the rear shock bodies instead for equal front and rear ride heights.

PAGE 33, BODY MOUNTING

Mount the body on the chassis, and use a felt-tip pen to mark where you need to make small body post and antenna holes before you paint. The body-mounting dimples provided on the Pro-Line F360 body don't

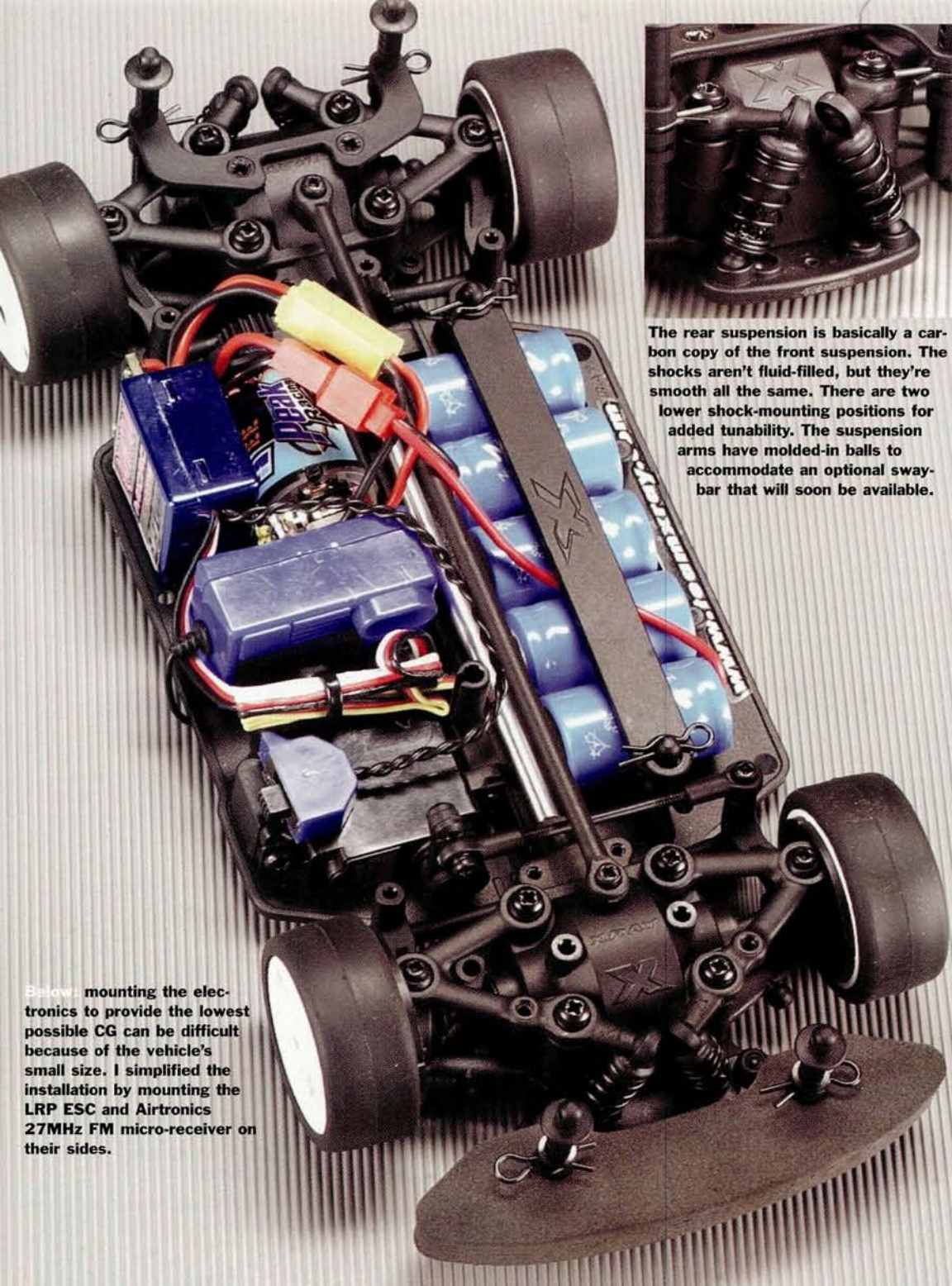
line up with the M18's body posts. You'll also need to use a marker to outline the rear-wheel cutouts because the M18 has a slightly shorter wheelbase than the body is designed to accommodate.

you'll need

- Transmitter and receiver
- Micro steering servo
- 5-cell micro battery pack
- ESC
- Micro motor
- Polycarbonate-compatible paint
- Tire glue

factory options

- 5-cell, 1.6mm graphite chassis—item no. 38111 (blue), 38112 (silver), 38115 (black)
- Blue graphite chassis conversion set for 300-size motors with battery holder and aluminum motor mount—381151
- Power pack with motor, battery, ESC and microservo—389100
- Hard-coated aluminum ball diff—385001
- Adjustable turnbuckle set—383300
- Aluminum fluid-damped shocks with tuned spring set—388300



Below: mounting the electronics to provide the lowest possible CG can be difficult because of the vehicle's small size. I simplified the installation by mounting the LRP ESC and Airtronics 27MHz FM micro-receiver on their sides.

The rear suspension is basically a carbon copy of the front suspension. The shocks aren't fluid-filled, but they're smooth all the same. There are two lower shock-mounting positions for added tunability. The suspension arms have molded-in balls to accommodate an optional sway-bar that will soon be available.

SPECIFICATIONS

MANUFACTURER XRAY
MODEL M18
DISTRIBUTED BY Serpent USA
SCALE 1/18
PRICE \$99
Varies with dealer

DIMENSIONS

Wheelbase 5.9 in. (150mm)
Width (F/R) Adjustable, 3.85 in. (98mm) to 3.97 in. (101mm)/4.09 in. (104mm) to 4.21 in. (107mm)

WEIGHT

Total, as tested 14.5 oz. (410g)

CHASSIS

Type Flat plate
Material Composite plastic

DRIVE TRAIN

Type Shaft-driven, full-time 4WD
Primary 36T spur gear/17T, 19T, 21T, 23T pinions
Internal ratio 2.5:1
Final drive ratios 1.57:1, 1.71:1, 1.89:1, 2.12:1
Drive shafts Plastic universals
Differentials Bevel gear
Bearing type Metal-shielded

SUSPENSION (F/R)

Type Double wishbone with upper and lower suspension arms
Shocks Coil-over, friction

WHEELS

Type White, split-spoke

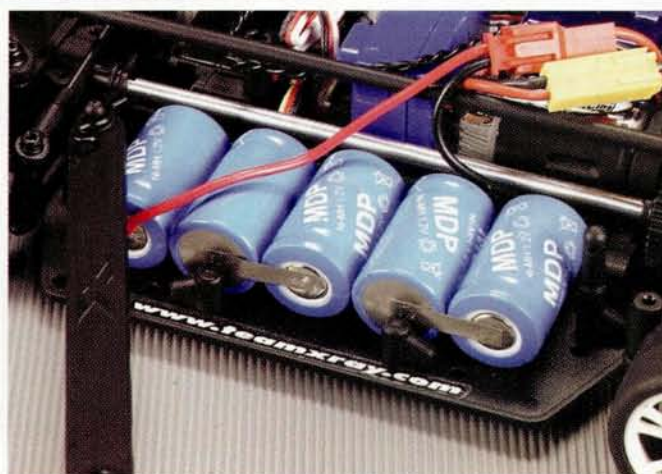
TIRES

Type Soft-compound slicks

BODY

Pro-Line Modena 150MM

Below: battery installation is easy, thanks to the battery strap that's held in place with body clips. Check out the molded, chassis-stiffening rod that's secured to the gearboxes.



PERFORMANCE

Before I set the car down on the track, I decided to whip out the radar gun to get some speed data while the battery pack was peaked. The M18 made several 17.9mph passes in front of the radar gun—very quick for a micro-car—but that was with the 19T pinion gear installed. I geared up to the 23T pinion and made a few more passes; it clocked a 21.7mph top speed, which is just sick-fast for an 1/18-scale machine. I knew the M18 would accelerate quickly because of its freely-spinning drive train, but its acceleration and top speed exceeded my expectations. I couldn't help but wonder what this thing would do with a 6-cell battery pack and a more powerful motor (I'm sure that we'll answer that question in a future issue).

To test handling, I set up a small micro track in my front driveway using 1/2-inch PVC pipe. I made a challenging course with several switchback turns, a couple of sweepers and a long, 25-foot straightaway. The stock tires provide ample traction after they've warmed up a bit, but the M18 is still capable of exceeding the tires' traction limit when pushed hard. The super-responsive M18 has razor-sharp steering characteristics that might be a little unnerving for some drivers. I had to dial in a considerable amount of negative expo to tone down the steering sensitivity. I managed to test the car's durability by launching it off corner markers and clipping a few pipes while I was getting acclimated to its handling characteristics. After a few transmitter adjustments and more wheel time, I had the M18 tearing up the track.

The M18 turns in well and holds a tight line in the corners. I had to slow down on the sharper switchback turns, however, to prevent it from pushing into the pipes (smaller-scale cars on tracks with narrow lanes tend to do this). On a larger, 1/10-scale track, the M18 has more steering than you'll ever need. The M18 really shone on the high-speed sections of the track. It carried an amazing amount of speed through the sweeper and sent dust trails behind it as it sped down the straightaway.

The M18 handled the track with amazing precision; that's impressive, considering the car was box-stock. I decided to install a complete set of TRC foam tires to see whether the tire swap would improve handling even further. The foam tires turned the M18 into a dialed-in racing machine. Acceleration and top speed were noticeably improved, and the tires provided gobs of traction. I was able to drive the M18 harder and faster and to lower my lap times considerably.

THE VERDICT

The M18 may be smaller, but it gives up nothing to larger 1/10-scale 4WD touring cars in terms of performance. The fully independent suspension provides exceptional handling, and it can be adjusted to suit your driving style and various track surfaces. The freely spinning drive train provides rocket-like acceleration and longer run times, and it's virtually maintenance-free. The parts quality and fit are second to none, and the excellent instructions make the M18 fun and easy to build. The M18 is also very sturdy and can take an amazing amount of abuse on the track. Overall, I'm extremely impressed with the XRAY M18 and recommend it to anyone looking for a small car with big performance.



RATING THE XRAY M18

	POOR	FAIR	GOOD	VERY GOOD	EXCELLENT
INSTRUCTIONS	Very little text but the excellent, full-color illustrations make building a snap.				
PARTS FIT AND FINISH	Everything fits perfectly: no slop, no binding and no flashing to remove.				
CORNERING ABILITY	The M18 turns very aggressively and is super-responsive.				
ACCELERATION	The M18 accelerates like a rocket, thanks to the ultra-smooth drive train.				
DURABILITY	Not only is the M18 durable, but its parts also don't show any signs of wear even after hours of running.				

RADAR TESTED TOP SPEED 21.7MPH*

BEST BUYER Anyone looking to get into 1/18-scale micro-racing

* Top speed varies with equipment used.

LIKES

- > Super-efficient drive train.
- > Tunable independent suspension.
- > Compatible with HPI Micro-RS4 body, wheels and tires.
- > Excellent handling.

DISLIKES

- > Plastic motor mount.

TEST GEAR



LRP Quantum Micro ESC

Don't let its small size fool you; the Quantum Micro ESC is jammed with many features that are found on LRP's racing ESCs, including: high-performance SMD-MOS FETs; adjustable power control; full short-circuit protection; reverse-disable; and a super compact and lightweight design. The Quantum Micro comes prewired with the appropriate micro battery and motor connectors for solder-free installation.

Additional items used to complete the XRAY M18



Peak Performance
Micro Modified motor

MDP 1100mAh NiMH
battery pack

Hitec HS-85MG
servo

Airtronics
M8 radio
system



SOURCES

AIRTRONICS (714) 978-1895;
airtronics.net

NITROHOUSE.COM
(949) 830-0304;
order (800) 928-0304;
nitrohouse.com

NOVAK ELECTRONICS INC.
(949) 833-8873;
teamnovak.com

PEAK PERFORMANCE
(714) 692-8533;
peakmotors.com

XRAY MODEL RACING CARS
distributed by Serpent Inc. USA
(305) 639-9665; teamxray.com

SUPER

COMPETITION ESC GUIDE

THE LATEST generation of competition ESCs are jammed with features that allow you to customize the throttle and brake parameters to suit different motors and various track conditions. They're also smaller, lighter, more powerful—and, in many cases—much easier to program. We gathered the latest high-end hardware and put it all together in this handy guide, so you can compare features and select the super speedo that's right for you. If there's an ESC that can help you win the A-main at the next club race, you'll probably find it right here.



AIRTRONICS F-3000

The Airtronics F-3000 comes wired with standard battery and motor connectors for plug-and-go convenience. The ESC can handle 10-turn motors, and because it's a forward-only unit that makes it ideal for racing. The ESC allows you to adjust the drive frequency from 2 to 4kHz to suit a particular motor or track conditions. When the voltage drops below 4 volts, a low-battery "caution" feature lowers motor rpm to let you know it's time to recharge the battery pack. It also has a heat protector that shuts down the ESC if it becomes overheated, as well as overload protection in the event of a short.

QUICK SPECS

F-3000

Item no.: 963172

Price: \$100

No. cells: 6 to 7

Motor limit: 10 turns

User programmable: yes

Included accessories: capacitors; Schottky diodes; programming tool; instructions.

WATERPROOF



MTRONIKS CIRRUS

The Mtroniks Cirrus electronics are encased in a full-body aluminum heat sink to keep the latest generation of GEN-Xi FETs running cool. The Cirrus has adjustable throttle profiles, brakes, punch control and drive frequency ("throttle curve" in Mtroniks lingo), and the adjustments are divided into initial setup and extended setup modes, so you can skip the technical stuff and just go racing. The Cirrus is also 100-percent waterproof, so you won't have a heart attack when you drive your RC vehicle through a puddle.

QUICK SPECS

CIRRUS

Item no.: 159185

Price: \$170

No. cells: 4 to 10

Motor limit: none

User programmable: yes

Included accessories: power capacitor; Schottky diodes; 12-gauge wires; decals; instructions.

WHAT IS A COMPETITION ESC?

The ESCs in this guide had to meet certain criteria to be considered competitive units. First, they had to be forward-only speedos. Although the ESCs included here have brakes, they do not have reverse, as it isn't allowed in sanctioned racing. Second, the ESCs in this guide have a motor-wind limit of 10 turns or less. These two simple criteria distinguish sport ESCs from the competition ESCs evaluated here and those used by the pro's.

SPEEDOS

by George M. Gonzalez & Jason Sams

**SMALLEST
& LIGHTEST**



**IFMAR WORLD
CHAMPION 2002
TOURING CAR**

FUTABA MC800C PRO

The World Champion MC800C Pro has three user-selectable drive programs (Power Control, Hyper Brake and Neutral Brake) and a special Start Acceleration function that's claimed to shorten the response time of the ESC for quicker starts. External solder posts allow custom installation on any RC vehicle, and it's super-compact and lightweight thanks to the latest surface mount technology (SMT). The MC800C can be powered by as few as 4 cells without the need for an external battery pack, and that makes it perfect for 1/12-scale and micro racing.

QUICK SPECS

MC800C PRO

Item no.: FUTM0939

Price: \$160

No. cells: 4 to 7

Motor limit: 5 turns

User programmable: yes

Included accessories: power capacitor; motor capacitors; programming tool; cable ties; 12-gauge wire; double-sided tape; instructions.

THE ESC THAT TALKS TO YOUR PC

The KO Propo VSF2000 is the first ESC that allows you to adjust the throttle operating frequency in 32 individual steps with your laptop or PC. With the optional VFS PC interface, you can see all 32 adjustable throttle steps on your computer screen at the same time and adjust each step instead of scrolling from screen to screen with the optional hand-held setting adapter. Each step's frequency settings appear in a graph that allows you to see the throttle curve you have created. You can upload the adjustments directly to the ESC with the interface or transfer the data for up to four throttle profiles to the hand-held setting adapter to use at the track later.



KO PROPO

VFS2000 • VFS2000J

KO Propo's VFS2000 features a 32-step, variable drive frequency system that can be adjusted according to the throttle trigger position. Racers can adjust the drive frequency for each and every one of the 32 throttle steps to create their own custom powerband. The optional hand-held VFS setting adapter is required to program the ESC, or you can program it with your PC using the optional VFS PC interface. The VFS2000J (not shown) has all of the same specs and features as the VFS2000, and it also comes wired with 15-gauge wire and standard battery and motor connectors. The VFS2000J model is programmed to conserve battery power for operating the steering when the battery level becomes low.

QUICK SPECS

VFS2000

Item no.: 40030

Price: \$200

No cells: 4 to 7

Motor limit: none

User programmable: yes

Included accessories: power capacitor; Super Schottky diode; 12-gauge wires; servo-lead extension; instructions.

QUICK SPECS

VFS2000J

Item no.: 40032

Price: \$200

No. cells: 4 to 8

Motor limit: none

User programmable: yes

Included accessories: installed power capacitor and 15-gauge wire with standard connectors; Super Schottky diode; servo-lead extension; instructions.



**EXTERNAL
PROGRAMMER**



KEYENCE

ZERO V • ZERO V EXTREME

Both the Zero V and Zero V Extreme have digital readouts right on the case of the speedo. The LED display even reads "Hello" when you turn them on. Both units have no motor limits and can handle between 4 to 6 cells, but the Extreme has an "Adjustable Enhanced Start Mode" that allows you to set the amount of power sent to the motor for the start of the race. Both ESCs also offer adjustable drive, brake and neutral frequencies.

QUICK SPECS

ZERO V

Item no.: Z006

Price: \$170

No. cells: 4 to 6

Motor limit: none

User programmable: yes

Included accessories: heat sinks; servo tape; capacitors; instructions; decals.

QUICK SPECS

ZERO V EXTREME

Item no.: Z007

Price: \$190

No. cells: 4 to 6

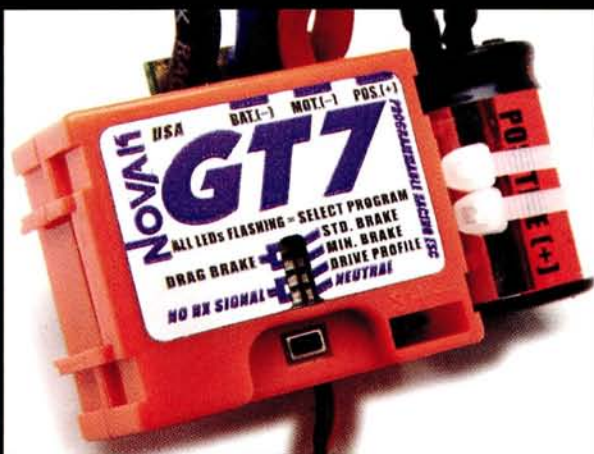
Motor limit: none

User programmable: yes

Included accessories: heat sinks; servo tape; capacitors; instructions; decals.

	AIRTRONICS F3000	DURATRAX Intellispeed 8T Pro	FUTABA MC800C Pro	GM RACING V8	GM RACING V12 XC	GM RACING V12 WE	KEYENCE ZERO V
Motor limit	10 turns	8 turns	5 turns	None	None	None	None
Number of cells	6 to 7	6 to 7	4 to 7	4 to 10	4 to 10	4 to 10	4 to 6
Pushbutton setup	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Forward current	500 amps constant, 2000 amps max.	1200 amps constant, 4700 amps peak	*	400 amps	720 amps	600 amps	Unlimited
Brake current	*	*	*	80 amps	150 amps	100 amps	Unlimited
Operating frequency	2 to 4kHz**	244 to 15620Hz**	3.1kHz	2 to 6kHz**	2 to 4kHz**	2 to 4kHz**	100 to 20000Hz**
User programmable	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wire gauge	14	12	12	12	12	14	14
Solder posts	No	Yes	Yes	Yes	Yes	Yes	Yes
BEC	*	6 volts/3 amps	5.8 volts	6 volts/3 amps	6 volts/3 amps	6 volts/3 amps	5.8 volts
Weight (without wires, unless specified)	1.48 oz. (42g) with wires	1.45 oz. (41g)	0.6 oz. (17.5g)	0.67 oz. (19g)	0.67 oz. (19g)	0.67 oz. (19g)	1.044 oz. (29.6g)
Dimensions	1.1x1.31x1.05 in. (28.3x33.3x26.7mm)	1.73x1.22x0.71 in. (44x31x18mm)	1.1x1.02x0.55 in. (28x26x14mm)	1.26x1.06x0.55 in. (32x27x14mm)	1.26x1.06x0.55 in. (32x27x14mm)	1.26x1.05x0.55 in. (32x27x14mm)	1.47x1.08x.71 in. (37.4x27.5x18mm)

* Specification not provided by manufacturer. ** Adjustable frequency



NOVAK GT7

Novak's GT7 is the company's flagship speedo with several key features for competition. The GT7 has seven distinct profiles to choose from that allow you to customize the throttle response for the type of track and surface you run on. One of the profiles is open for change so users can customize it. The compact GT7 is the ESC choice for pro drivers Brian Kinwald and Jukka Steenari.

QUICK SPECS

GT7

Item no.: 1785

Price: \$140

No. cells: 4 to 6

Motor limit: none

User programmable: yes

Included accessories: Schottky diode; servo

tape; cable ties; on/off switch and power

capacitor mounting brackets; power capacitors; decals;

instructions.

KEY FEATURES TO COMPARE

Despite the broad range of prices, all of the ESCs in this guide are designed for racing and any one of them can get you on the podium. Some ESCs have more features and adjustments than others, but they all do essentially the same thing: control the throttle and brake. With that in mind, here are key features to look for when choosing a competition ESC for your car or truck.

MOTOR LIMIT. It's always better to buy an ESC that can handle more motor than you plan to use. In other words, if you plan to run 11- or 12-turn motors in your buggy or truck, pick up an ESC that can handle motors with fewer than 10 turns. Thinking about strapping a 10 turn in your 4WD touring car? An ESC with no motor limit is best. The last thing you want to worry about during a race is having your ESC go into thermal shutdown because it got too hot because of overgearing or because it's being pushed too hard.

NUMBER OF CELLS. Most electric racing classes are limited to 6 cells; every

ESC in this guide can handle 6-cell battery packs and low-turn, modified motors. Some 1/12-scale cars, however, require 4-cell battery packs, and those who are looking for serious speed often strap in a 7-cell pack. With this in mind, be sure to buy an ESC that is designed to handle the type of battery pack you plan to use.

ADJUSTABLE OPERATING FREQUENCY. This advanced feature allows you to adjust the operating frequency to customize the "feel" of the throttle trigger. A lower operating frequency is great for stock motors because it makes the throttle feel more responsive (punchier), and it's also great for mod racing on tracks that have lots of traction. Higher frequencies smooth out the throttle response when using low-turn motors or racing on slippery tracks. Many of the ESCs in this guide allow you to adjust the operating frequency, or they provide different profiles designed for various racing applications.

KEYENCE ZERO V EXTREME	KO PROPO VFS2000	KO PROPO VFS2000J	LRP QUANTUM COMPETITION 2	LRP IPC V 7.1	LRP IPC SR	MTRONIKS CIRRUS	NOVAK GT7
None	None	None	5 turns	None	None	None	None
4 to 6	4 to 7	4 to 7	4 to 7	4 to 8	4 to 8	4 to 10	4 to 6
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unlimited	182 amps normal, 728 amps max	182 amps normal, 728 amps max.	80 amps continuous, 120 amps max.	690 amps	610 amps	1000 amps peak	640 amps
Unlimited	*	*	*	165 amps	145 amps	300 amps peak	160 amps
100 to 20000Hz**	500 to 650Hz**	500 to 650Hz**	Reactive	3140Hz	3140Hz	2 to 5kHz**	1 to 23kHz**
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	12	15	14	14	14	12	14
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5.8 volts	2 amps	2 amps	5.8 volts	6 volts/3 amps	6 volts/2.5 amps	5.6 volts/3 amps max.	6 volts/3 amps
1.044 oz. (29.6g)	0.72 oz. (20.5g)	0.72 oz. (20.5g)	0.76 oz. (21.5g)	1.5oz. (42g)	1.5 oz. (42g)	0.92 oz. (26g)/1.52 oz. (43g) with wires	0.93 oz. (26.26g)
1.47x1.08x0.71 in. (37.4x27.5x18mm)	1.28x1.14x0.60 in. (32.5x29x15mm)	1.28x1.14x0.50 in. (32.5x29x15mm)	1.13x1.01x0.57 in. (28.7x25.7x14.4mm)	1.69x1.34x0.75 in. (43x34x19mm)	1.69x1.34x0.75 in. (43x34x19mm)	1.1x1.22x0.61 in. (28x31x15.5mm)	1.37x1.11x0.66 in. (34.8x28.2x16.8mm)

WATERPROOF



**IFMAR WORLD
CHAMPION 2003
2WD OFF-ROAD**



LRP ELECTRONIC

QUANTUM COMPETITION 2 • IPC V7.1 • IPC SR

LRP offers three competition grade units: the Quantum Competition 2, IPC V7.1 and IPC SR. Depending on a number of monitored variables, the Competition 2's revolutionary Reactive Software actually changes the drive frequency during a race for gains in traction and acceleration without any loss of top speed. The Comp 2 is also completely waterproof. The IPC V7.1 and IPC SR are slightly larger than the Comp 2, and a lot of the Team Associated drivers use them for off-road racing. Neither of the units has a motor limit; they are among the most durable ESCs available. Billy Easton recently won the 2WD Class at the Off-Road Electric Worlds using a Comp 2.

QUICK SPECS

QUANTUM COMPETITION 2

Item no.: LRP8083
Price: \$160
No. cells: 4 to 7
Motor limit: 5 turns
User programmable: yes
Included accessories:
Schottky diode; servo tape;
cable ties; programming
tool; decals; power capaci-
tor; motor capacitors;
universal connectors;
instructions.

QUICK SPECS

IPC V7.1

Item no.: LRP8069
Price: \$140
No. cells: 4 to 8
Motor limit: none
User programmable: yes
Included accessories:
servo tape; cable ties; pro-
gramming tool; decals;
power capacitor; motor
capacitors; universal con-
nectors; instructions;
Schottky diode; heat sinks.

QUICK SPECS

IPC SR

Item no.: LRP8063
Price: \$140
No. cells: 4 to 8
Motor limit: none
User programmable: yes
Included accessories:
servo tape; cable ties;
programming tool; decals;
power capacitors; motor
capacitors; universal con-
nectors; instructions;
Schottky diode; heat sinks.

AUTOMATIC THROTTLE CONTROL

The LRP Quantum Competition 2 is the first ESC that automatically adjusts the throttle operating frequency based on a number of variables as the vehicle is running. That's right: the ESC actually senses when you need low-frequency punch, high-frequency smoothness, or any variation in between; it also constantly adjusts the power flow to suit. Not only is this new software high-tech, the ESC is extremely easy to program. All you have to do is set the neutral point and throttle and brake high points with the easy-to-use digital software, and you're ready to go. No need to adjust the drive frequency; the software does it automatically every time you drive the model—freaky, but effective.



GM RACING

V8 • V12 XC • V12 WE

GM Racing offers several high-end ESCs to choose from that won't break your bank account even if you run low-turn modified motors. The V8 and V12 XC have no motor limits, so you can strap in any sick motor you want to run. The V12 WE (not shown) is the "Worlds Edition" unit that all of the GM Racing drivers used in the recent IFMAR World Championships. The V12 WE can handle up to 10 cells for insane high-speed runs, and its small case size and weight allow it to fit in any vehicle.

QUICK SPECS

V8

Item no.: GMM2841

Price: \$120

No. cells: 4 to 10

Motor limit: none

User programmable: yes

Included accessories: Schottky diode; 12-gauge wire; instructions; gold battery connector tubes.

QUICK SPECS

V12 XC

Item no.: GMM2846

Price: \$170

No. cells: 4 to 10

Motor limit: none

User programmable: yes

Included accessories: Schottky diode; 12-gauge wire; instructions; gold battery connector tubes.

QUICK SPECS

V12 WE

Item no.: GMM2842

Price: \$170

No. cells: 4 to 10

Motor limit: 7 turns

User programmable: yes

Included accessories: Schottky diode; 12-gauge wires; instructions; gold battery connector tubes.

DURATRAX

GM RACING



DURATRAX

INTELLISPEED 8T PRO

The Intellispeed 8T Pro has many user-programmable custom features. The ESC's drive frequency, current limit, brake minimum and maximum levels and auto brake (drag brake) can be adjusted, or you can select from one of the five preprogrammed profiles to help you set up the ESC for a particular track or racing class. There's even a sixth profile that allows you to store your own custom parameters. Programming the Intellispeed 8T Pro is simple and unique; just use your transmitter's throttle/brake trigger to switch between the various settings as well as make adjustments. The ESC's LEDs confirm your settings by flashing or turning a particular color.

QUICK SPECS

INTELLISPEED 8T PRO

Item no.: DTXM1080

Price: \$80

No. cells: 6 to 7

Motor limit: 8 turns

User programmable: yes

Included accessories: motor capacitor; Schottky diode; heat sinks; heat-shrink tubing.

SOURCES

AIRTRONICS (714) 978-1895; airtronics.net.

DURATRAX distributed by Great Planes Model Distributors; duratrax.com.

FUTABA distributed exclusively by Great Planes Model Distributors; futaba-rc.com.

GM RACING distributed by Horizon Hobby Inc. (217) 355-9511; horizonhobby.com; gm-racing.com.

GREAT PLANES MODEL DISTRIBUTORS (217) 398-6300; (800) 682-8948; greatplanes.com.

KEYENCE distributed by Schumacher USA (813) 889-9691; keyence.com.

KO PROPO USA INC. (310) 532-9355; kopropo.co.uk.

LRP ELECTRONIC distributed by Team Associated (714) 850-9342; teamassociated.com.

MTRONIKS distributed by Global Hobby Distributors (714) 964-0827; globalhobby.com.

NOVAK ELECTRONICS INC. (949) 833-8873; teamnovak.com.

by Brian Leslie

WHAT'S COOLER than jamming on the gas and lifting the front wheels as you rip down the straight and then power-sliding through the corners with the wheel fully cocked to the right as you carve to the left? That's sprint-car racing, and nothing sounds better to me, so I set out to build the ultimate RC version. Since I was going for "ultimate," I built for performance and beauty. No expense was spared, and the result is the sick machine you see here. Using the Team Associated RC10GT platform, I added the best parts in the industry from the hottest manufacturers. My Ultimate Sprinter features trick components from Hammad Ghuman, Hardcore Racing, Team Associated, Bullet Racing, Fantom, MIP, Pro-Line, Airtronics, RPM and JPS. Check it out!

ULTIMATE ELECTRONICS

AIRTRONICS

Steering servo—94357Z; \$138
Throttle servo—94737Z; \$138
MX3 transmitter—90511; \$105

ULTIMATE SPRINTER ULTIMATE SPRINTER ULTIMATE SPRINTER

SERIOUS SIDEWAYS MACHINE



ULTIMATE



BEHIND THE WHEEL

The Ultimate Sprinter's first run was in a large parking lot where I knew I could open it up and shake things out with no worries. The Fantom motor had already been broken in, and it started without hassles. I ran a few small circles to make sure everything was working properly and then sent the sprinter screaming away with a full squeeze of the trigger. Fantom definitely made its FR12 strong, and this race car simply rips. It launches strongly and pulls right up to top speed. It doesn't take very long for this car to get from one end of the parking lot to the other.

The parking lot had the usual road grime, and this made it even easier to power-slide the sprint car around; this was a blast! The huge wing delivers a solid, planted feel that keeps you in control; with that big airfoil up top, the Ultimate Sprinter sets up well and has no problem with long, sweeping slides. You can't beat the sight of this beautiful beast running sideways, and the accompaniment of the Fantom Works pipe is sheer nitro music. This sprinter is so much fun to run around that I am 100-percent pleased with how this ultimate project worked out.

SPRINTER

SHOPPING CART

CHASSIS

BULLET RACING

- > Roll cage w/B118 body—BC01; \$198.

HARDCORE RACING

- > Custom-made chassis—priceless!

SUSPENSION

TEAM ASSOCIATED

- > Shock caps (blue)—1598; \$11/pair
- > Shock kit (blue)—3962; \$50
- > Shock-spring kit—1581; \$8
- > Steering block—6221; \$2
- > Front block carrier—6210; \$3
- > Rear A-arms (wide track)—6355; \$5
- > Front A-arms (wide track)—6206; \$6
- > Front axles—6220; \$6

HAMMAD GHUMAN

- > Hub carrier—2300; \$35
- > Shock-spring retainer—5230; \$10
- > A-arm mounts—2200; \$26
- > Rear bulkhead—2100; \$33
- > Upper shock mounts—5200; \$10
- > Rear shock tower—2142; \$33
- > Alloy ball ends—8310; \$10

MIP

- > Gold shock shafts—1115; \$4/pair

RPM

- > Rod ends—73375; \$5/set
- > Center link—70892; \$3

LUNSFORD

- > Turnbuckle kit B3—2004; \$24
- > Hinge-pin kit—3012; \$19

ENGINE & ACCESSORIES

FANTOM

- > Engine FR12—F1011; \$219
- > Works pipe—F035; \$62

BULLET RACING

- > Exhaust manifold—RE4995hd; \$15

TRANSMISSION & DRIVE TRAIN

TEAM ASSOCIATED

- > Stealth transmission—7671; \$83

HAMMAD GHUMAN

- > Top shaft—1100; \$26
- > Idler gear—1526; \$10
- > Diff nut—1804; \$10
- > Tranny brace—1240; \$12

MIP

- > CVD (B2, shiny)—1198; \$29
- > Gold shock shafts—1115; \$4

WHEELS & TIRES

PRO-LINE

- > Front tires (2.2 in.)—1060; \$17/pair
- > Rear tires (2.2x2.25x3.5 in.)—1061; \$12/pair

JPS

- > 10-hole wheels (F/R)—no part number; \$48/pair

To hold everything together, I used Associated anodized hardware. The fuel lines and pressure tube are covered with electrical wiring nylon "snake" tubing and painted silver to imitate braided line. You have to remove the tail section frequently to access the fuel cell, so it's held in place by a standard post and body clip.

The Bullet frame is completed with a stock RC10GT chassis that must be cut following a template that's included with the tube frame. I skipped this step and instead gave the Ultimate Sprinter three custom titanium pieces cut by Hardcore Racing.

To achieve the right look and scale appearance, I installed wide-track Associated RC10 buggy A-arms. The rear arms are mounted on Hammad Ghuman aluminum GT zero-degree mounts. The titanium hinge pins and turnbuckles are from Lunsford, and they're paired with hardened-alloy ball joints from Hammad Ghuman and RPM's heavy-duty ball cups.

ULTIMATE SPRINTER



Bullet Racing out of Phoenix, AZ, produces a real "down-tube-style" frame. Made of $\frac{5}{32}$ -inch high-tensile steel rod, it looks like the real thing, it's functional; all the welded joints are smooth, clean and nicely filled. Gussets are well placed in high-stress areas. It's available in 20 powder-coat colors and two plating colors, so you are sure to find the color you want.

SPRINTING FOR LESS

I spared no expense to build a sprinter showpiece, but you can put together a sprinter for racing at a fraction of the cost. All you need is an Associated RC10GT—new or used—and the Bullet Racing cage kit with body. You'll have to cut the chassis, but making the effort is well worth the money saved. These sprint-car setup tips will get you started after you've put your sprinter together:

- Use stiffer springs on the right side.
- Set positive camber at zero or 1 degree on the left front wheel.
- Set negative camber at 1 to 3 degrees on the right front wheel.
- Run the differential almost locked; after completely tightening the diff nut, back it out half as much as you usually would.

Check out the action from the Nitro Tour—a racing series for nitro sprint cars just like the Ultimate Sprinter. For more info on this racing series, log on to dirtoval.com.

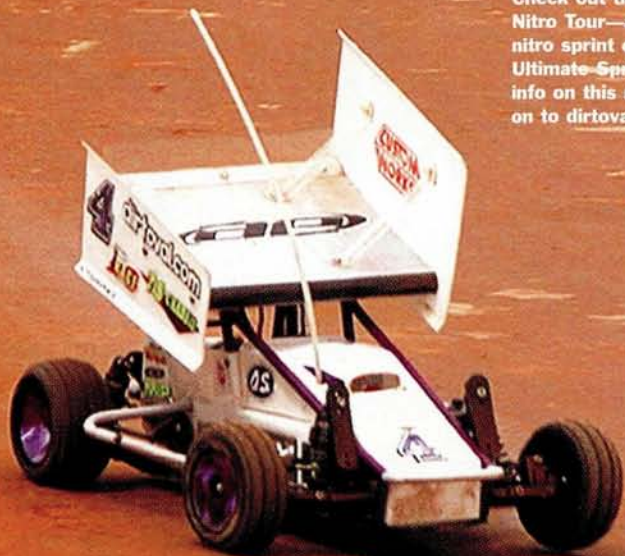


PHOTO BY WENDY BOYD



Fantom's FR12 rear-exhaust racing engine produces 1.15hp with a max rpm of 41,700. All in all, the FR12 is a nice-looking, powerful engine.

SOURCES

- AIRTRONICS** (714) 978-1895; airtronics.net.
BULLET (602) 241-0414; rcsprintcars.com.
FANTOM (616) 649-9583; fantom-motors.com.
HAMMAD GHUMAN (518) 782-9255; 1hg.com.
HARDCORE RACING (888) 928-7223; racinghardcore.com.
JPS (530) 275-1950; jpspro.com.
LUNSFORD (541) 928-0587; lunsfordracing.com.
MIP (763) 535-0939; miponline.com.
PROLINE (909) 849-9781; prolineracing.com.
RPM (909) 393-0366; rpmrcproducts.com.
TEAM ASSOCIATED (714) 850-9342; teamassociated.com.

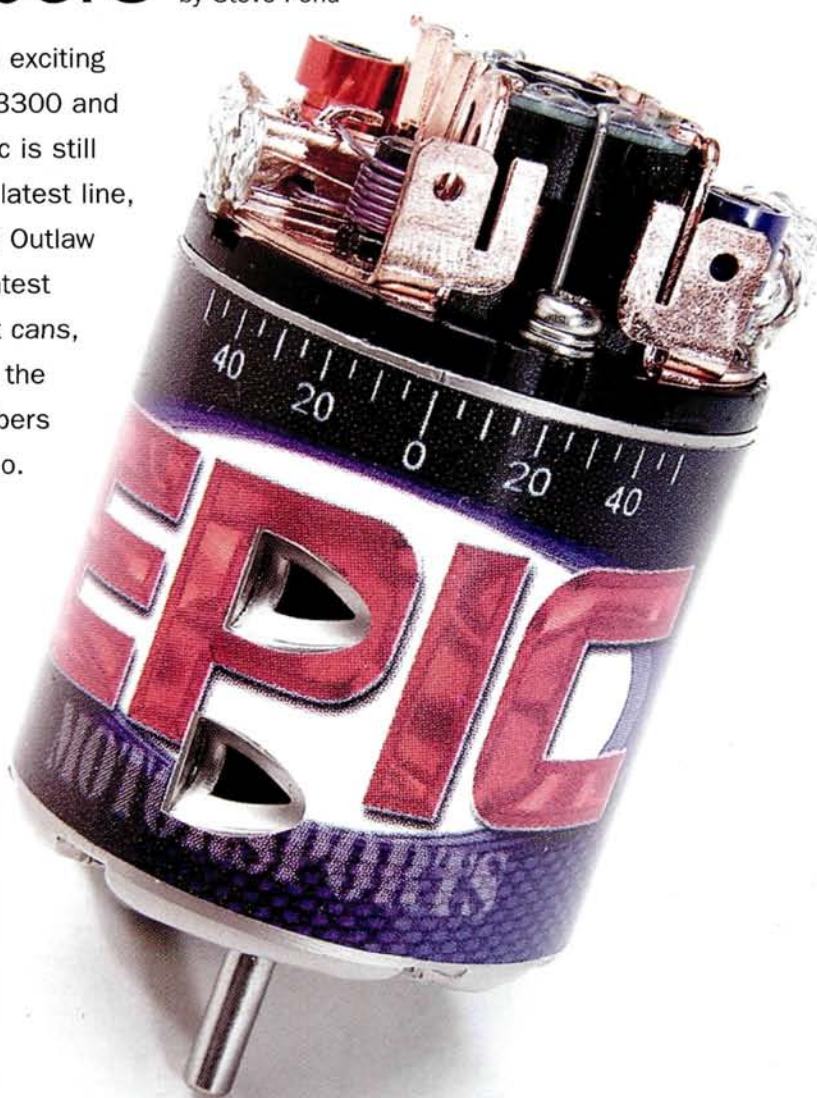
Epic **Binary2** modified and **Outlaw** stock motors

Power by numbers by Steve Pond

Epic Motorsports division is putting out some exciting batteries and nitro gear—the Monster Metal 3300 and Epic .18 T-Maxx engine, for example—but Epic is still best known for its motors. The Binary2 is its latest line, and it's available in hand-wound modified and Outlaw stock versions. These two motors have the latest brushed-motor technology, including 4-magnet cans, and a few non-ROAR-legal features that make the stock motor an Outlaw. But it's the dyno numbers that really count, so let's see what they can do.

BINARY2 MODIFIED

The Binary2 modified is a premium hand-wound that's intended and legal for competition. It's available in 6- to 14-turn versions—both with single-wind armatures using flat wire instead of round wire (although the 12-turn Euro-spec motors are available with round wire). Another of the Binary2's calling cards are split magnets. According to Epic, the 4-magnet design is based on the technology used in high-end slot-car motors that can accelerate a car from zero to 100mph in less than 1 second. In a 2-magnet motor, the magnetic force at the center of the magnet is straight across the can; it isn't a pushing force. This force interferes with the armature's rotation and reduces performance. The Binary2's 4-magnet design reduces this force, so overall motor performance is increased.



FEATURES

- > Extra-large copper brush hoods for increased efficiency
- > All capacitors are installed at the factory
- > Double-shunt, extra-large, serrated brushes
- > Polarized, color-coded, brush-shunt heat sinks
- > Precisely epoxy-balanced armature

The armature features flat wire that creates neatly stacked, more compact windings than standard round wire. Epoxy is used for precision balancing—a method that keeps the magnetic field as strong as it can be, and that means more torque.



ARMATURE. The Binary2's bare motor armature is like most other modified-class motors. Modified motors usually have plain laminations because they produce better torque than the trick laminations often used in stock motors. The laminations are fully stacked from end to end, and there's a full crown on each of the three poles. The really unique part of the B2's armature is the wire used to wrap the poles. Our test motor is a 10-turn model, but it's flat wire instead of the usual round wire, so the armature seems less crammed with wire.

No hand-wound modified motor would be complete without the benefit of epoxy-balancing. The Binary2 armature is epoxy-balanced; this better preserves its electromagnetic field (compared with motors that have been drill-balanced).

MOTOR CAN. A thick, platinum-colored can is the Binary2's foundation; on both sides, it has two directional vents punched into the can. The deep end of the vents also serves as an alignment aid when the magnets are installed in the motor. Eight vents have been punched in the bottom of the can, and even when the motor is mounted on a solid plate, there is still an airflow because the vents extend out to the can's edges. This allows a cooling airflow no matter how the motor is mounted.

The Binary2 magnets are "split," meaning there are four instead of two. In layman's terms, the timing of events inside a motor with four magnets is supposed to happen in manner that produces better power (not necessarily more power, but more "usable" power) than a two-magnet motor.



Above: the vents in the bottom of the modified can are more modest but more plentiful. These smaller vents allow ample cooling, but they maintain the strength of the magnetic field for better performance. Below: equally split magnets are installed in the Epic modified can. The four-magnet configuration is supposed to reduce torque to a more controllable level at low rpm and to increase it in the mid-range and at high rpm. This will suit 2WD off-road and paved oval applications in which having too much torque makes controlling vehicles more difficult.



ENDBELL.

The endbell's most distinguishing features are the printed circuit board (which is home to three installed motor capacitors), the copper brush hoods and the heat sinks. Most motors need capacitors to avoid radio interference, and most ESC manufacturers recommend three. The circuit board is held in place by tabs on the brush-hood heat sinks and by shunts that are hooked into the circuit board. These are fastened to the endbell by the screws that attach the endbell to the motor can.

There are three capacitors installed on a circuit board on top of the endbell. Large, double-shunt brushes get more power to the armature and don't wear as quickly as standard brushes.

Stand-up, large brush hoods are part of the design. Larger brushes are supposed to have the perfect amount of wrap, or contact with, the commutator. This is supposed to be ideal for energizing armature segments at precisely the right moment, which should mean more horsepower. The brushes are larger, so their surface area carries more current than a standard brush. The bigger brush is more efficient and takes longer to show signs of wear, and that makes for longer intervals between motor rebuilds.

The brush hoods are also made of copper, which is more conductive than aluminum (which is commonly used) and even more conductive than anodized aluminum. Last, the endbell features anodized-aluminum heat sinks for the brush shunts. The brushes are soldered to the brush hood for maximum efficiency, so you don't have to worry about the aluminum heat sinks increasing resistance. Aluminum has better thermal properties, and that's a fancy way of saying that it's better at getting rid of heat.

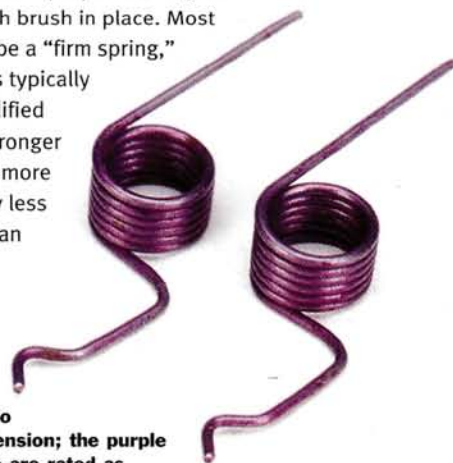
DYNO TEST EPIC BINARY2 MODIFIED

BRUSHES. The Binary2 brushes are unique to this Epic can design. They are slightly wider and taller than usual, and we know this means better power and longer use between brush changes and commutator truing. The brushes have dual shunts that carry twice as much power as a single-shunt brush. The brush faces are serrated for quicker break-in, and the brush shunts are soldered to the endbell for maximum efficiency.



The taller, wider brushes with double shunts carry more current than any standard brush. The brush size is designed to produce the best performance by optimizing the surface area that's in contact with the commutator.

BRUSH SPRINGS. A purple 180-degree spring holds each brush in place. Most consider this to be a "firm spring," and that's what's typically called for in modified motors; these stronger springs produce more torque and allow less brush bounce than lighter springs.



The Epic Motorsports brush springs are color-coded to indicate spring tension; the purple ones shown here are rated as "heavy."

DYNO TESTING

We tested the Binary2 Modified 10X1 motor on Car Action's Robitronic Pro-Master dyno. I set the dyno at the standard 7.5 volts to simulate a 6-cell battery pack and cranked it up. At peak rpm, this motor pumped out nearly 50,000rpm; in fact, it put out higher power numbers than any 10-turn we've tested and showed a 247.1W peak output. Most of the 10-turn motors we've tested have come in at around the mid-230W range.

The split magnets don't appear to help torque much; the Binary2 put out a max of 182.2 Newton millimeters (Nmm) and just 98.7 Nmm at peak power. Modified motors tend to be low in this department anyway, but our tests of other 10-turn motors have shown a range of 100 Nmm (the lowest) up to almost 130 Nmm at the top of the range. So the Binary2 doesn't set any torque records, but that isn't all bad. A close look at the test results shows that torque is lower early in the rpm range and stronger at the top end. This means that the Binary2 is less likely to spin the wheels coming out of the corners (where, in some cases, you don't really want all the power), but it pulls more strongly in the upper half of the range where horsepower and torque are at a premium.



A class-leading peak power output is the 10-turn Epic Binary2 motor's "calling card." Low-end torque is reduced and mid-range and peak rpm are increased.

Wind: 10 turns of flat wire
Brushes: serrated, double shunt
Springs: purple 180-degree
Commutator diameter: 0.297 in. (7.54mm)

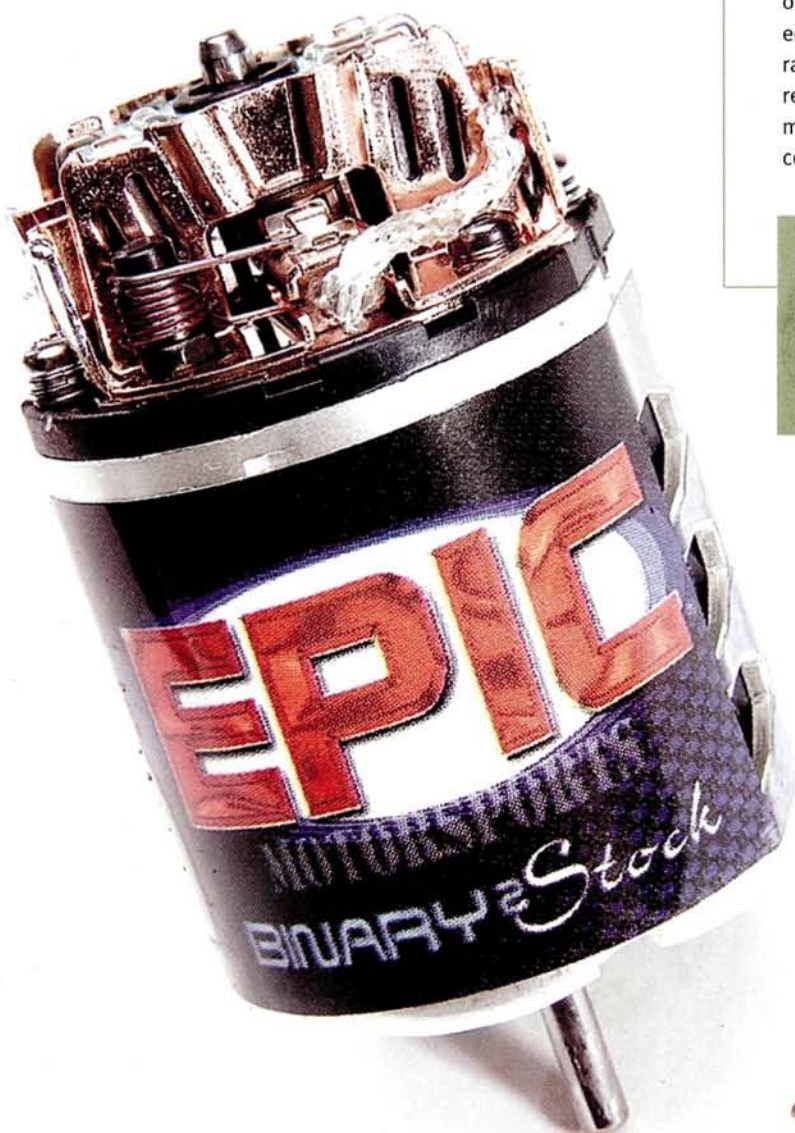
DYNO TEST RESULTS

Peak rpm: 48,060
Peak power (watts): 247.1
Peak torque (Nmm): 182.2
Torque C peak power (Nmm): 98.7
Peak efficiency: 77.3%

THE VERDICT

The Binary2 is a very strong, hand-wound, modified motor that produces better results than any other motor we've tested. It doesn't need to do anything but get your car or truck moving quickly and then take it to the upper limit of its speed. In that capacity, the Binary2 does its job very well and is among the best. Its price tag makes it more suitable for racers, but it's available to anyone who's prepared to pay for a premium motor.

BINARY2 OUTLAW STOCK



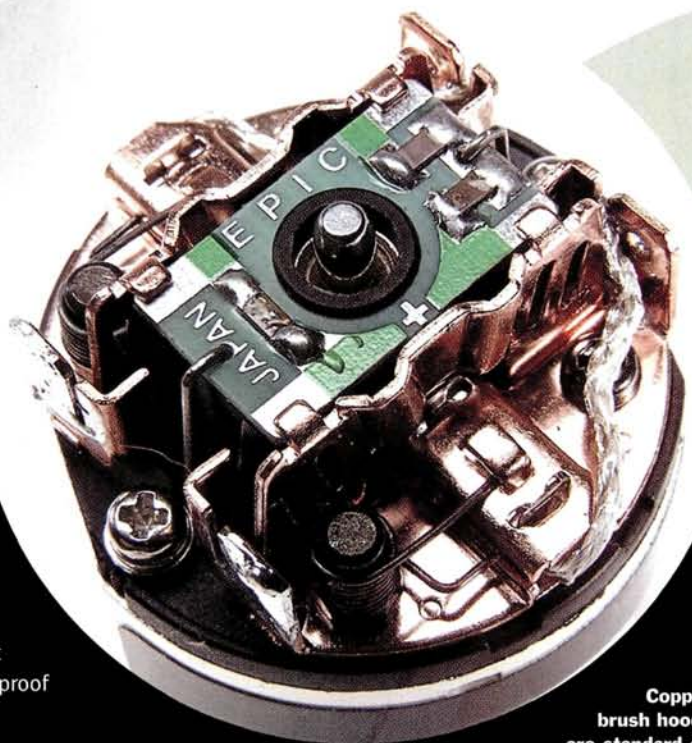
Stock-class motors are all supposed to provide the same power so that all the racers in an event have the same chance to run at the front if they've practiced and are well prepared. That's the official version; here's the reality: stock-class racing is one of the most competitive classes, and people try hard to gain an edge over the competition. The Binary2 Outlaw stock motor is not race-legal, so don't expect to run it at a track that specifically requires legal motors, but if the only specifications are that motors must have 27 turns of 22-gauge wire and 24 degrees of timing, this could be your motor.

FEATURES

- > Copper laydown brush hoods for increased efficiency
- > All capacitors are factory installed
- > Soldered laydown serrated brushes
- > Polarized, color-coded brush springs
- > Timing fixed at 24 degrees

ENDBELL. Like the modified Binary2 motor, the endbell's most distinguishing features are the copper brush hoods and heat sinks and the printed circuit board that is home to the installed capacitors. The endbell's configuration is slightly different to suit this motor, but it has the same main features. A circuit board on its top houses the three capacitors that most ESC and radio manufacturers require to avoid interference.

The stock endbell is configured for standard laydown brushes, and the spring posts are both on one side of the endbell. The endbell's flat sides index it to the motor can and make this one of the most tamper-proof motors available—ironic because the B2 is an Outlaw motor.



Copper brush hoods are standard on both motors. Note the left and right springs that hold the laydown serrated brushes against the commutator.

ARMATURE. The first thing you'll notice about the armature is that there isn't a lot of it. In the center of the laminations, there's a huge slot that, like the big vents in the can, is designed to modify the electromagnetic field and make the motor run faster. The total distance from end to end of the laminations is still the same because a specific length of wire must be wrapped around each for the motor to be "legal," so a few more laminations were removed from the center of the stack to maximize the effect of the split rotor armature. The crown of what's left of each pole is very thin and notched to improve performance. Notice the machined step in the top of each crown; this feature also modifies the magnetic field for more effective timing without altering the motor's mechanical timing.



The armature crown is very thin, and it's stepped; this tweaks the magnetic field and increases the effective timing to produce higher rpm.

A larger-than-normal gap between the armature segments is created by removing laminations. This helps to increase motor rpm without altering the length of wire on the armature or the number of turns.

MOTOR CAN. The Binary2 Outlaw has an interesting flat-sided can that really can't be tampered with. It's one of the few things that's legal about this motor. Epic Motorsports suggests that this is the future of stock racing, so it makes sense that it would have some semblance of legality if the company has any hope of having a motor like this legalized in the future.

Large vents punched in the can enhance cooling and are designed to weaken the magnetic field in a way that increases rpm.

Best of all are the magnets. They're split like those in the modified motor, but with a twist: the segments aren't all the same size. Look down into the can, and you'll see that on each side one magnet is longer than the other. This ingenious feature advances the magnetic field about 5 degrees clockwise without any change to mechanical timing.



The split magnets in the stock motor are not all the same length. The leading segment is longer than the adjacent one; this shifts the magnetic field a few degrees to the advanced side and increases motor rpm.



Four very large vents are punched in the bottom of the Binary2 Stock can for maximum cooling. The vents extend to the outside so the motor can still "breathe" even when it's mounted on a solid motor plate.

BRUSHES. The B2 Outlaw Pro has lay-down serrated brushes with the shunts soldered to the brush hoods. The serrations shorten break-in time, and their orientation prevents the commutator from being grooved (a problem that's common with brushes that have horizontal serrations).



BRUSH SPRINGS. Like other high-performance stock motors, the Binary2 Outlaw has polarized brush springs. A medium-firm red spring holds the positive brush, and a slightly softer medium-green spring holds the negative brush. The theory is that the positive brush should be more firmly planted against the commutator and that the negative brush can be run a little more loosely. The lighter brush spring will free up a little more rpm, so it's included for the negative side of the endbell. The motor also has right and left springs. The spring posts are both on one side of the endbell instead of being opposite each other. This means that the motor must use a conventional spring on one side of the endbell and a "backwards" spring on the other side. The design keeps the brush springs away from the damaging heat of a soldering iron as long as you don't attach the motor leads to the tabs closest to both brush springs.



Springs of differing tensions are installed at the factory to ensure an optimum balance of torque and rpm.

DYNO TESTING

We tested the Binary2 Outlaw on the Robitronic Pro-Master dyno with a different rpm-detection setting. The dyno has one setting that is optimized for modified motors and one for stock. After selecting the stock profile, we ran about a dozen tests on the Binary2.

The peak power—126 watts—is right in the same range as most current high performance stock motors'. The surprise was its peak rpm: it ranges from as little as 1,500 more to nearly 10,000 more than some of the best stock motors to cross this dyno. It's really something to see what's essentially a stock motor twist up to a peak of almost 37,000rpm during testing. For reference, the average stock motor peaks at anywhere between 26,000 and maybe 33,000rpm. The tradeoff is that it has a lower torque reading than the most powerful stock motors. It performs closest to the Monster Stock motor, but it has even more rpm.

Wind: 27 turns of 22-gauge wire

Brushes: serrated, laydown with single shunt

Springs: polarized, left and right-hand springs

Commutator diameter: 0.294 in. (7.47mm)



The Binary2 stock features overall power that's in the range of most tuned stock motors. It still has the same physical timing and the same number of turns on the armature. The split magnets and new armature design bump peak rpm to new heights for a motor with this wind configuration.

DYNO TEST RESULTS

Peak rpm: 35,664

Peak power (watts): 126

Peak torque (Nmm): 115.2

Torque C peak power (Nmm): 68.4

Peak efficiency: 67.2%

THE VERDICT

The Binary2 Outlaw stock is the highest-revving stock motor we've tested, but it isn't exactly legal. Certain features keep it in line with the spirit of the rules, but the epoxy-balancing and split magnets will not be acceptable at tracks that follow stock-class rules. If, on the other hand, you aren't exactly restricted to the rules, and you've gravitated towards high-rpm motors, watch out for the Binary2 because nothing will touch it when it comes to high revs.

GEARING THE EPIC BINARY2 MODIFIED MOTORS

This information comes directly from Epic Motorsports, and it will help you to gear the Binary2 motors for some of the more popular on-road and off-road competition vehicles. You'll need to experiment to get the perfect gearing because track conditions differ, but this will get you started.

TRUCKS AND BUGGIES	BINARY2 STOCK	BINARY2 MOD*
Losi Triple-X	23/78	12T Mod, 20/78
Losi Triple-XT	22/86	12T Mod, 189/86
Associated B4	22/81	12T Mod, 189/81
Associated T4	18/87	10T Mod, 15/87
Schumacher FireBlade	23/95	12T Mod, 19/95

TOURING CARS	BINARY2 STOCK	BINARY2 MOD*
Losi Triple-XS	25/90	10T Mod, 18/90
Associated TC3	26/72	10T Mod, 20/72
Schumacher Mission 20T pulley	23/90	10T Mod, 18/90
Yokomo MR4	26/81	10T Mod, 19/81
XRAY T1	27/93	10T Mod, 21/93

*For lower winds, use a pinion with one less tooth per wind. For example, if the suggested pinion for a 10-turn is a 19T and you want to run a 9-turn motor, use an 18T pinion.

SOURCES

EPIC MOTORSPORTS (732) 635-1090; epicmotorsports.com.
ROBITRONIC; robitronic.com.

BY THE RC CAR ACTION TEAM



Spashett reaches his Peak

David Spashett of Great Britain is arguably one of the most consistent electric on-road specialists in the world and has three IFMAR World Championships to his credit. Spashett will run Peak PowerFlo cells and Vantage V2 motors in his Team Losi Triple-XS for the '04 racing season. He joins current IFMAR World Champion Surikarn Chaldejsuriya under the Peak tent.

SITE SEEING



Check out this site's footage of some sick RC mayhem. T-Maxxes, stadium trucks and even snow-going machines get radical in front of the camera. This site is totally free, and the guys at slapmafro keep adding new stunts to their list of video archives.

BOARD WALK

FROM THE
RADIOCONTROLZONE
.COM BULLETIN BOARD

Spool and one-way?

ZIGGO: What's the difference between a spool and a one-way, and their effectiveness?

CARDBOARD: A spool is basically a locked diff.

BOBESOPHALUS: A one-way allows the front wheels to coast off power and increases corner speed, but the rear-wheel-only braking can be difficult for some to drive.

First hop-ups?

NEWBIE45: I and can't wait to "unstock" my new nitro truck. What should I get?

LOSIGUY1090: A new body (20 bucks), a new cooling head (20 to 40 bucks) and maybe some new tires for the surface you plan to run on most.

RCCARDEU04: Purchase a rechargeable receiver pack and NiMH charger. You'll get the same run time, but you'll be able to recharge the battery again and again.

Runs & starts good until it gets warm?

QUINTON: My 2.5 T-Maxx runs well the first half of a tank, but then the engine dies and I can't restart it for a few minutes. What's up with my engine?

HENRYHUCKEM: The engine might have lost compression. You might have to rebuild it with a new piston and sleeve.

RCRACER2471: It's showing signs that the engine is too lean. Check the temperature. A couple of drops of water should sit on the cooling head for a few seconds. If it the water evaporates immediately, the engine is running too lean.

BE HEARD! LOG ON AT
RADIOCONTROLZONE.COM



NORRCA GAS NATS WINNERS

The annual NORRCA Gas Nationals were held in Saugus, CA, at Hot Rod Hobbies. Nearly 200 nitro entrants competed in six off-road classes that included 1/10-scale trucks, 1/8-scale buggies and monster trucks. Here are the podium makers:

CLASS	WINNER	VEHICLE
Expert 1/10 Truck	Adam Drake	Team Losi Triple-XNT Drake Edition
Sportsman 1/8 Buggy	Tom Smith	Kyosho Inferno MP 7.5 Kanai
Sportsman 1/10 Truck	Mike Cumel	Team Associated Factory Team GT
Unlimited Monster Truck	Marty Korn	GS Racing SUT
Monster Truck	Andrew Smolnik	CEN MT 2
Expert 1/8 Buggy	Travis Amezcua	Hot Bodies Lightning Pro

Two for Teemu

Teemu Leino won the Team Orion Speed Weekend race in Germany with his Schumacher Mi2 and Orion power. It's his second consecutive victory in Europe after a year and a half away from racing, so Leino is obviously back up to speed!



FIRST RACE FIRST WIN FOR GS RACING SUT

GS Racing's Storm Unlimited Truck (or "SUT") made an auspicious debut by winning the NORRCA Gas Nats Unlimited Monster Truck class. GS Team driver Marty Korn TQ'd and won the class, which was filled with many converted 1/8-scale buggies outfitted with full-blown racing engines. Korn won the race using 95 percent of the SUT's stock parts, including the GS pull-start engine. Look for a "Track Test" soon.

"I was so nervous during my run that my knees were shaking, and I was sweating like a pig."

Mugen's Chad Bradley after putting in a great run at the NORRCA Nationals

SPEED SHOP

XIPP Xapper DCX3300 with digital display

The Xapper DCX3300 is Xipp's latest evolution of the battery zapper. It's used to increase battery voltage and lower internal cell resistance. The unit is fully adjustable and can zap a cell with a voltage range of 1.2 volts up to 90 volts. Other features include a high-power mechanical switch, trouble-free arm-and-fire operation and a small, convenient case. The Xapper was specifically designed to enhance the newest high-capacity cells, including the NiMH 3300, NiMH 3000 and Ni-Cd 2400s. The Xapper has twice as much zapping power as the original DCX3000, and its unit is designed for racers who really want to maintain their battery packs and obtain the highest possible voltage and power. The Xapper comes with a custom cell holder that allows you to zap a single cell or cells in pack form (in a side-by-side configuration).

Xapper DCX3300 with digital display—item no. 50012; \$160.
Xipp; distributed by Integy (909) 444-2766; integy.com.



REEDY NiMH 1100mAh receiver packs

Looking to power up your gas car or truck? Reedy now offers these 5-cell NiMH receiver packs to fit most popular vehicles. Choose between the flat pack for most touring cars or the hump pack for off-road cars such as the RC10GT. Both packs come with a standard plug attached.

Reedy NiMH 1100mAh receiver packs—614 (flat)/615 (hump); \$25.
Reedy a division of Team Associated (714) 850-9342;
teamassociated.com.



NOVAROSSİ Special Gold glow plug

This new Special Gold extra-hot glow plug (non-turbo) fits all .12, .15, .18 and .21 engines made by Novarossi, Rossi, Picco, Sirio, etc. that use a standard plug. This plug can be used in very cold temperatures. Basically, it's Novarossi's equivalent to a McCoy MC59.
Special Gold glow plug—C4S; \$6.
Novarossi; distributed by Trinity (732) 635-1600; teamtrinity.com.



TAMIYA TA04 racing rear stabilizer set

With a thicker wire and no standing crank, a more direct anti-roll effect is obtained on your TA04 with the new racing rear stabilizer set from Tamiya. It has a simple design that allows it to be inserted into the rear gear case. The stabilizer rod was used in the TA04-R tuned chassis, so it can be used as a spare rod for the 53611 Racing stabilizer set (front). The rear stabilizer set includes one soft, one medium and one hard racing stabilizer, and it is compatible with all TA04 chassis.

TA04 Racing rear stabilizer set—53676; \$11.
Tamiya America Inc. (800) 826-4922; tamiyausa.com.

TRACK THREADS

SERPENT MOTORSPORTS Team clothes

Serpent fans can now order their favorite trackside gear online at Serpent's website. They'll find everything from parkas to sweaters and polo shirts to T-shirts. For more info on pricing and sizes, check out Serpent USA's website.
Cap black/gray—SER1990; \$20.
Sweatshirt (gray, medium)—SER1923M; \$37.50.
Serpent Inc. USA (305) 639-9665;
serpent-usa.com.



UNDER THE HOOD

Jon Orr's

Team Associated RC12L3

EQUIPMENT USED

Transmitter: KO Propo EX-10 Helios

Receiver: KO Propo KR-297FZ

ESC: LRP Quantum

Servo: KO Propo PDS-947FET

Battery pack: Reedy 3300

Motor: Reedy PT 9-turn double

Tires: Jaco

Traction compound: Paragon

Body: Parma

Gearing: 24/100

SETUP

FRONT

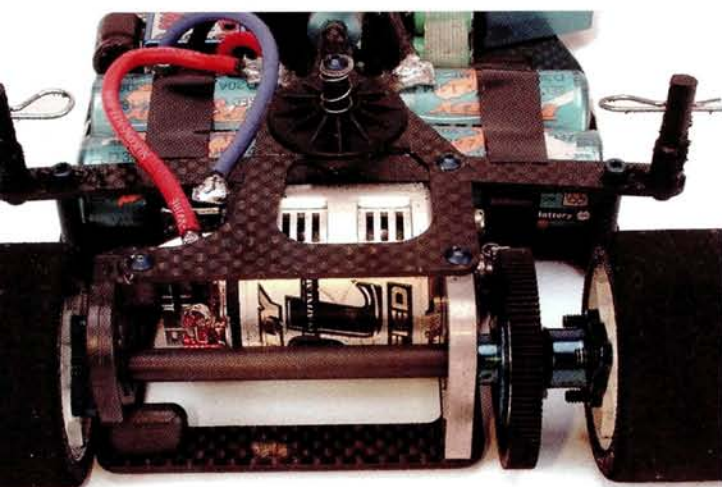
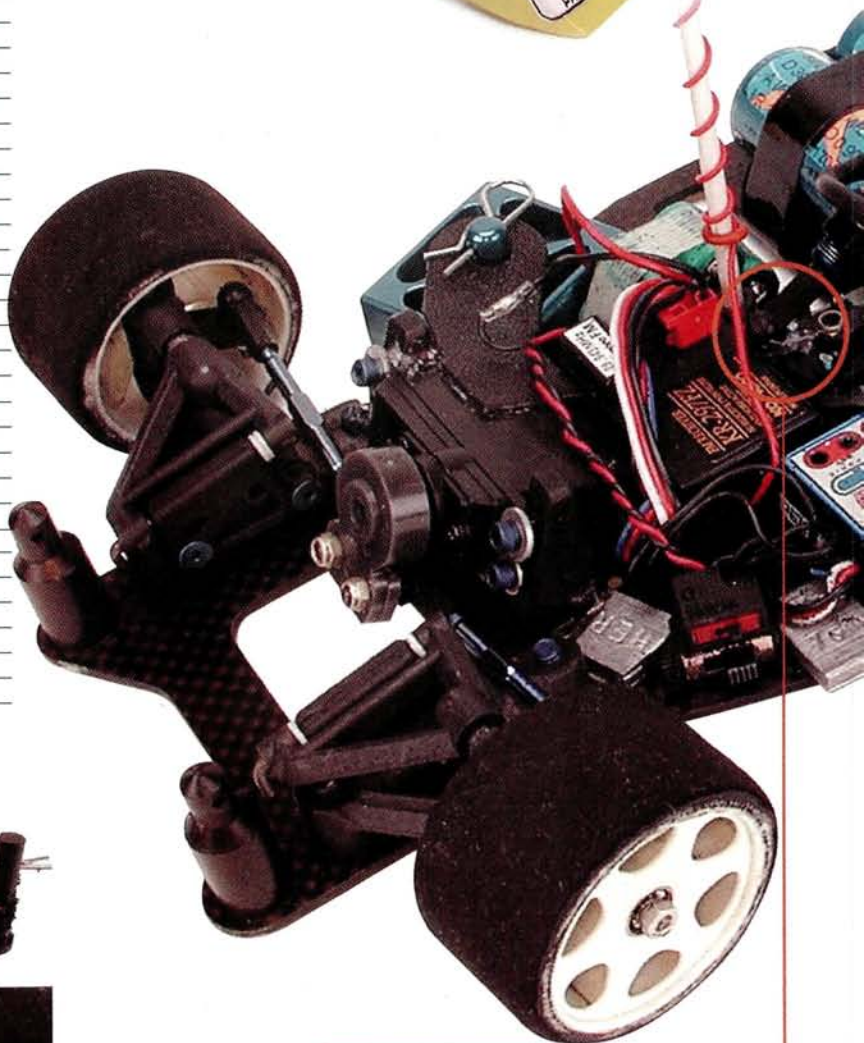
Suspension spacers (qty.)	4
Camber	1 deg. negative
Toe	0.5 deg. out
Springs	0.20
Upper arm mounts	10 deg.
Caster (right wheel)	Spacers mounted behind upper arm
Caster (left wheel)	1 spacer in front and 1 in back
Tires	Jaco double pink
Tire treatment	Applied to inside half
Tire diameter	1.71 in.

REAR

Shock fluid	35WT
Shock spring	Green
Spring preload	Bottom plate level with chassis
T-bar thickness	0.076 in.
T-bar spacers	One (0.015)
Damper springs	Stock
Damper spring spacer	0
Damper roll-stop insert	None
Damper lube	Yes (clear Hydra fluid)
Ride-height adjustment	No. 4 down
Tires	Jaco pink
Tire treatment	Applied to the full contact patch
Tire diameter	1.84 in.
Spoiler	No

FACTORY AND AFTERMARKET OPTIONS

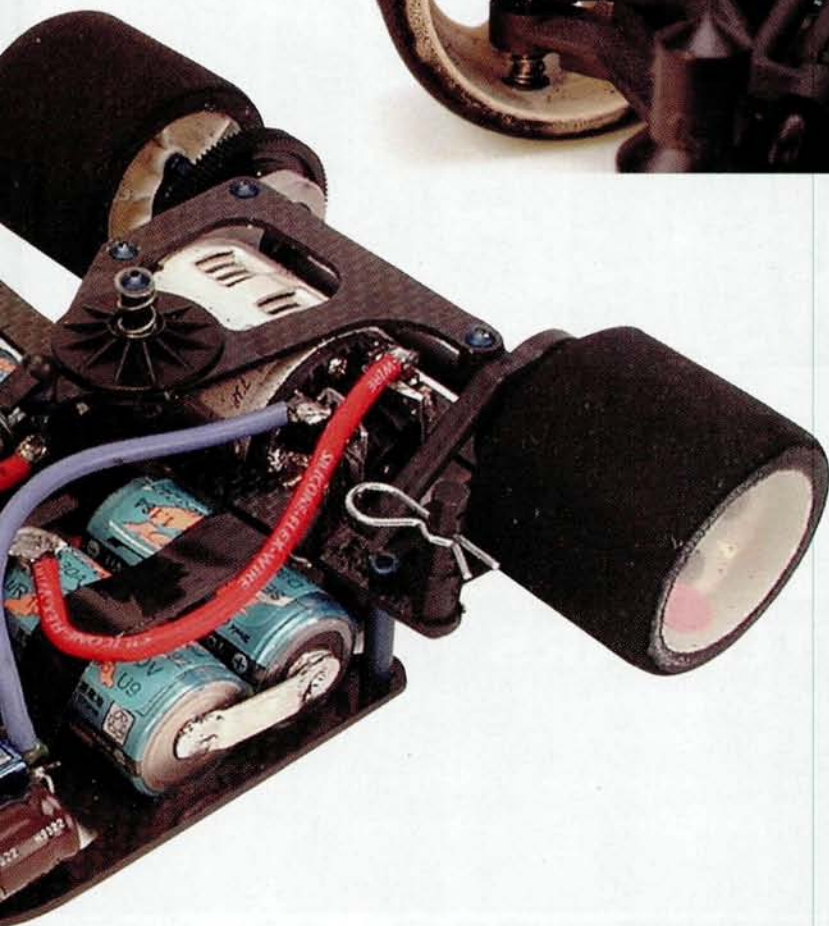
IRS Big Ring Diff



Look closely at the shock-mounting ball cup: Jon placed a small piece of cellophane on the ball stud to reduce slop and to keep the ball cup from popping off the ball stud in an impact.

A Reedy PT 9-turn double kept Jon's car running in front. Many of the other drivers in the A-main ran 8-turn motors. Jon's car is basically box stock except for the IRS Big Ring Diff; it's a popular mod with many top drivers because it makes the diff action feel like butter.

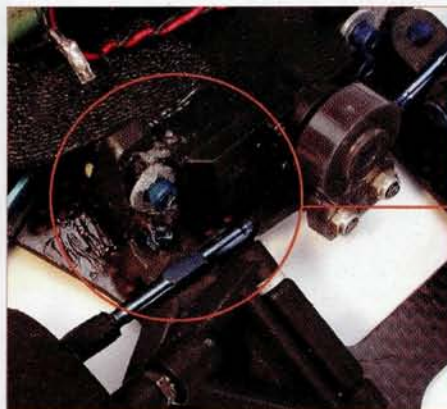
Jon applied thick grease to the front springs and kingpins to damp the front suspension. Talk about truing the tires down to the rims; these 1/12-scale cars leave very little space between the chassis and the track.



FACTORY DRIVER HOT MOD

Jon mounted the steering servo forward 8mm to provide room to mount the electronics on the chassis to help balance weight. This required drilling new holes in the chassis for the servo mounts.

He also had to grind away material from the front suspension blocks to provide room for the servo mounts in their new location so the steering turnbuckles could move without binding.



SOURCES

IRRGANG RACING SERVICE
(IRS) (609) 476-2371;
teamirsrc.com.

KO PROPO (310) 532-9355;
info@kopropo.com.

LRP; distributed by Team
Associated (714) 850-9342;
teamassociated.com.

PARMA/PSE
(440) 237-8650;
parmapse.com.

REEDY; distributed by Team
Associated (714) 850-9342;
teamassociated.com.

TEAM ASSOCIATED
(714) 850-9342;
teamassociated.com.

5 QUESTIONS



DRIVER: Jon Orr

AGE: 31

LAST BIG WIN: 2003 U.S. Indoor Champs 1/12-scale Mod class

SPONSORS: Associated, Reedy Modifieds, Jaco Tires, KO Propo, LRP, Protoform, Pro-Line, Irrgang Racing Service (IRS)
WHEN I'M NOT RACING: I spend time with the family, watch sports and mountain bike.

RC CAR ACTION: How about a recap of some of your biggest racing accomplishments?

JON ORR: My biggest win was at the 1/12-scale On-Road Nationals in Houston in 1998. During the third Main, I battled Joel Johnson the entire race, and I think we swapped positions about five times in just one lap. I won the 1/12-Scale Mod class at the '94 U.S. Indoor Champs where, believe it or not, I passed Joel on the last lap to take the win. I am also proud of finishing second in 1/12 and third in 1/10 at the 1998 IFMAR On-Road World Championships in England. I also finished third at the '94 1/10-scale Worlds in Germany.

RCCA: The U.S. Indoor Champs ran practically around the clock. How did you adjust to racing in the afternoon on one day and then at 1:30 a.m. the following morning?

JO: That's a funny question because a lot of my racer friends know that I like to get my sleep. I had to run my last 1/12th practice run at 4:00 on Thursday morning and most of the guys were surprised to see me still up. Knowing the race was going to be so hard mentally, I tried to catch naps any time I had downtime and tried to eat healthy foods. I totaled the hours I slept during the event: about 20 hours during a 5-day period.

RCCA: A lot of spectators said David Spashett's car was in front of your car at the transponder loop, yet the timing computer had your car ahead by 1/100 of a second. What's your take?

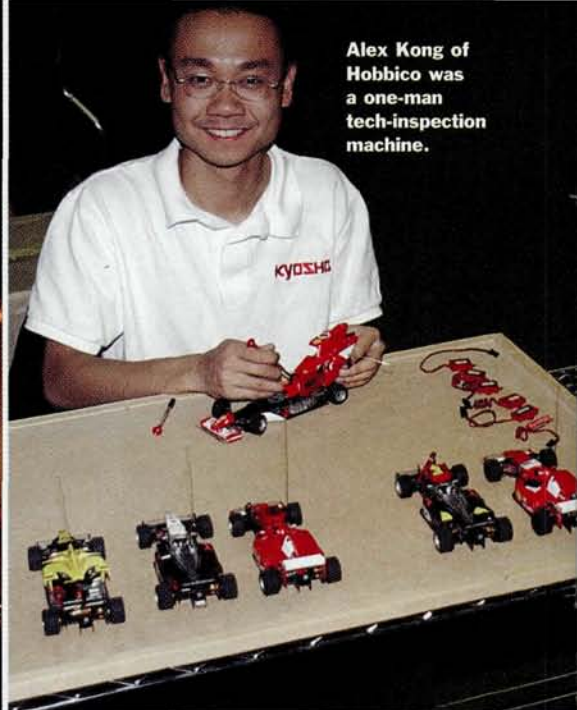
JO: At the time, I honestly didn't know who won and neither did David Spashett. At first, I thought the finish was at the end of the computer table, and I thought David beat me to it. But then I realized the finish line was actually about 20 feet before that mark and I definitely knew that I reached that point first. After that race, it was rumored that the actual timing loop under the carpet was a couple of feet before the line that was painted on the carpet. My car made it "there" first—wherever "there" was.

RCCA: Which finish line? I didn't see a finish line painted on the carpet.

JO: The track crew painted a checkered line before the Mains, but it was difficult to see, and like I said, the timing loop was nowhere near it.

RCCA: You're one of the few people who can say he won the 1/12-Scale Mod class at the U.S. Indoor Championships more than once. So, do you think you might be able to win the Touring Mod class one day?

JO: I would like to think so. I am at a slight disadvantage learning the setup of touring cars right now because the track I currently race at is not suited to run a mod touring car. The owner of my local track might build a much larger carpet track in the near future, so maybe I won't be able to use that excuse much longer.



Alex Kong of Hobbico was a one-man tech-inspection machine.

Kyosho Mini-Z Cup Finals

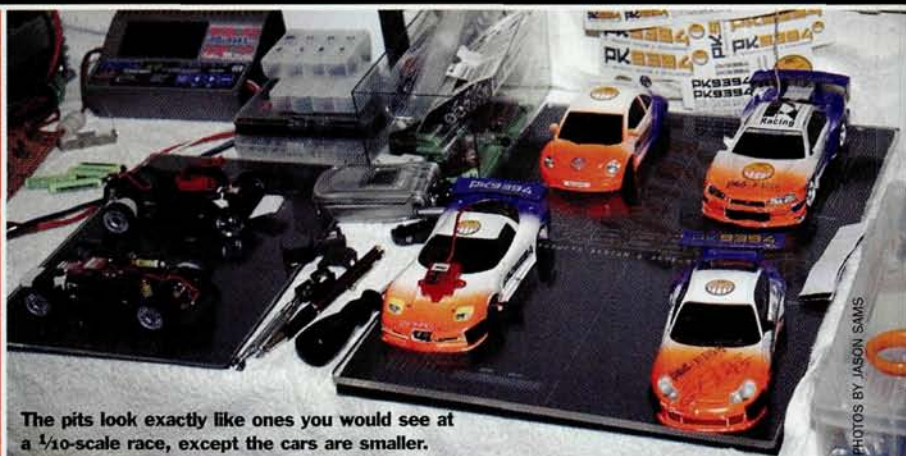
by Jason Sams

BIG STAKES FOR LITTLE CARS

With the help of hobby shops throughout the country, Kyosho hosted Mini-Z Cup races throughout the U.S. to qualify racers for the Mini-Z Cup Finals that were held in Las Vegas. Only the top six in every class at the regionals qualified for a spot in the prestigious nats, so only the best drivers competed in Vegas. If you think these little cars are more for fun than for racing, think again! The 60 plus entrants in the Kyosho Mini-Z Cup Finals weren't just playing around; these guys were gunning for a national championship!

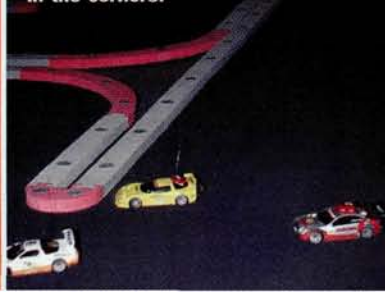
10 REASONS TO RACE MINI-Zs

1. Very inexpensive—they cost around \$150 ready to run.
2. Tunable—just like their bigger, $\frac{1}{10}$ -scale on-road counterparts. Tires, toe, suspension and body type can all be altered for performance.
3. After they are set up correctly, the Mini-Zs handle like the larger, $\frac{1}{10}$ -scale on-road cars.
4. They're tough; only one car broke during the entire weekend of racing.
5. Tracks can be laid out in small places: living rooms, garages and basements.
6. Hop-ups and replacement parts are much cheaper than $\frac{1}{10}$ -scale stuff.
7. Racing programs for these cars are growing, so look for a race near you.
8. Eight AA batteries for the transmitter and 4 AAA batteries for the car are all you need to go racing.
9. No big toolboxes or large travel bags to tool around; I all of the spare parts—and the Mini-Zs—will fit in a small toolbox or bag.
10. It's the most realistic racing out there because Mini-Zs are totally scale.

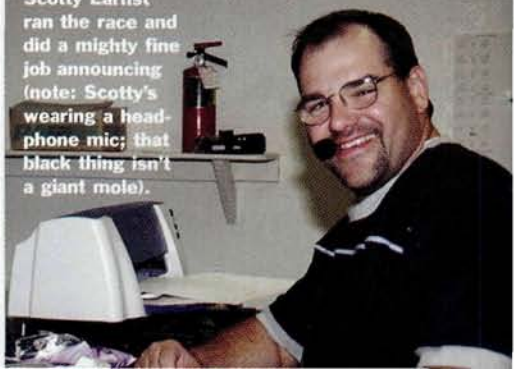


The pits look exactly like ones you would see at a $\frac{1}{10}$ -scale race, except the cars are smaller.

The racing action was exciting as racers checked up in the corners.



Scotty Earnst ran the race and did a mighty fine job announcing (note: Scotty's wearing a head-phone mic; that black thing isn't a giant mole).

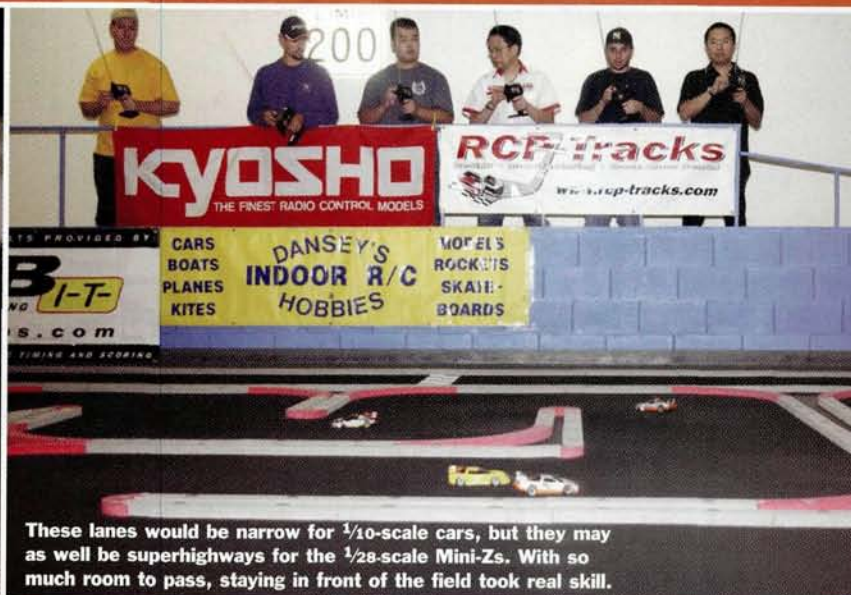


BILL CROTTY'S MINI-Z MRO1 OPEN SETUP

FRONT SPRINGS Red
 REAR ROLL SPRINGS Yellow
 REAR SHOCK SPRING Green
 T-BAR Heavy
 BODY Corvette
 MOTOR Kyosho X-speed
 modified
 PINION 7-tooth
 CAMBER 2-deg.
 HOP-UPS Kyosho ball-diff,
 carbon-fiber H-plate,
 roll shocks



A Taisan Porsche GT3R leads a Corvette C5-R as it countersteers through a chicane. Thanks to their display-quality bodies, Mini-Z racing looks incredibly "real."



These lanes would be narrow for 1/10-scale cars, but they may as well be superhighways for the 1/28-scale Mini-Zs. With so much room to pass, staying in front of the field took real skill.

winners

Racer stock

FINISH	DRIVER	CITY & STATE
1	(TQ) Bill Crotty	Lee, NH
2	Alan Mok	New York, NY
3	Mike Wenzel	Sun Prairie, WI



Racer open

FINISH	DRIVER	CITY & STATE
1	Philip NG	Temple City, CA
2	Mike Vukelich	Santa Cruz, CA
3	(TQ) Bill Crotty	Lee, NH



f-1 open

FINISH	DRIVER	CITY & STATE
1	Mike Wenzel	Sun Prairie, WI
2	(TQ) Tim McNamara	Madison, WI
3	Allie Estes	Santa Cruz, CA

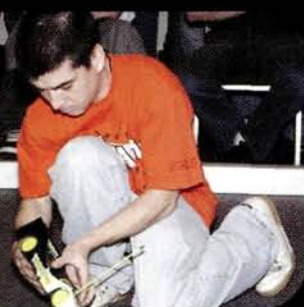


THE WRAP-UP

I participated in a few qualifiers at the Nationals, and I'm sold on Mini-Z racing. These aren't just for goofing around on the living room floor. Race-prepped Mini-Zs are ridiculously fast with modified motors, they handle well, and the level of competition is intense. Try it! ■

U.S. INDOOR CHAMPIONSHIPS

Sponsored by Trinity & RC Car Action



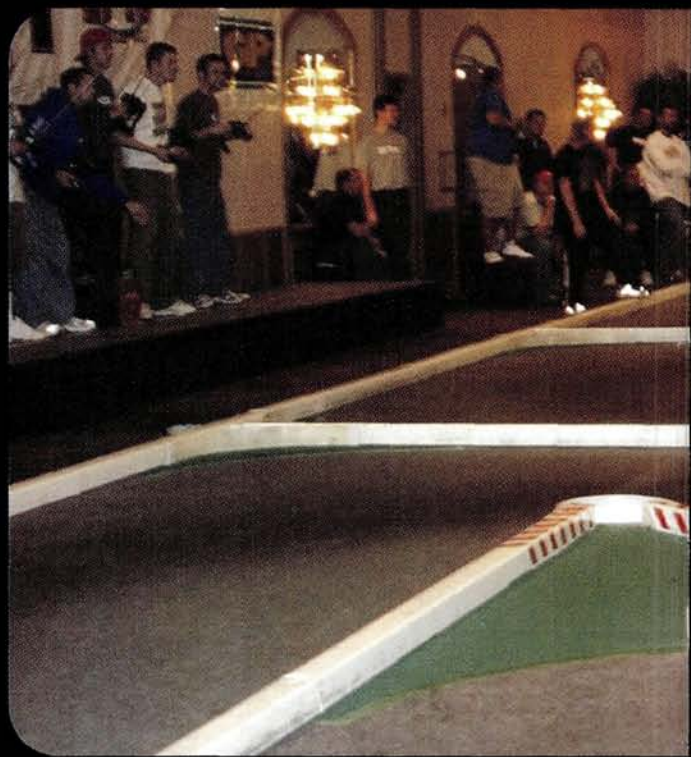
Novak's Charley Suanka wipes the excess tire sauce off Brian Kinwald's Trinity Switchblade 12. Charley was one of the few Novak reps at the event, so he was kept busy all week.

WHILE MOST OF YOU were enjoying a four-course meal over the Thanksgiving holiday, more than 500 $\frac{1}{12}$ -scale and $\frac{1}{10}$ -scale on-road racers met up in Cleveland to compete in the 24th Annual U.S. Indoor Championships, which is one of the longest-running races in RC. Many of the world's top racers came to compete along with some well-known off-road pro's. This high level of competition ensured intense, nail-biting action during the Mains with a few interesting twists thrown in for good measure.

by George M. Gonzalez



Frank Calandra's winning $\frac{1}{12}$ Masters class CRC Carpet Knife 3.2.



IFMAR World Champ and Team HPI factory driver Atsushi Hara experimented with a prototype $\frac{1}{12}$ -scale chassis in $\frac{1}{12}$ Mod. The car looked really good, but Hara got bumped out of the A-main in the last round of qualifying. He came back strong in Touring Mod, where he finished in second behind Mike Blackstock in the A-main.



Photos by George M. Gonzalez



ASSOCIATED SWEEPS THE CARPET

A-MAIN ACTION

STOCK. Mo Denton charged out in front at the start of the race with his Speed Merchant car while Vince and his CRC Carpet Knife tucked in behind him. Not long into the race, the crowd started to cheer Vicky Blackstock on as she made her way through traffic with her Team Associated car to claim third. The minutes continued to count down, and soon, Blackstock was all over Vince's tail looking for a way to get around.

Every time Blackstock came around the grandstands, we heard her father yelling "That's my daughter; she's going to win." That got the rest of the spectators even more excited, and soon, Blackstock had an entire cheering section. All of the

chanting must have motivated her because it wasn't long before she got around Vince and set her sights on the leader. With less than two minutes left in the race, Blackstock started to pressure the leader until her persistence paid off: Denton went high; Blackstock went low, and the spectators were all on their feet jumping up and down and cheering as Blackstock took the lead and went on to become the first woman to win an A-main at the U.S. Indoor Championships. Way to go, Vicky!

1/12 MASTERS. The Masters class is for racers aged 35 and older, and most of the guys in the A-main have been attending the U.S. Indoor Champs since the very beginning. Frank Calandra Jr. got the

holeshot with his own CRC Carpet Knife and disappeared in a cloud of carpet dust. After a few laps, it was apparent that Calandra was on a mission as he put more distance between himself and the rest of the field.

With five minutes down and three to go, the top three running order settled into a steady groove with Calandra way in front. Tom Esposito was sitting in second with his Trinity Reflex 12 with Ron Ferguson in third with his Team Associated 12L3. A couple of minutes later, Ferguson tapped a board, spun around and found himself behind Bob Vanwagner's CRC Six-Pack, which had just taken over third. Soon, Vanwagner started to inch up on Esposito, and we had a serious battle for second brewing with only seconds remaining

DUDE, YOU WERE BEAT BY A CHICK!

When Vicky Blackstock crossed the finish line first to become the first woman to win an A-main at the U.S. Indoor Champs, she raced into the record books. If her last name sounds familiar, it's because she is married to Team Associated factory driver Mike Blackstock, who happened to win the Touring Mod class.

It's easy to think that being married to a multi-national-champion driver had something to do with her success, but the truth is that she was fast before she ever met Mike. Vicky started racing with her dad, Tony Carrubba, when she was just 8 years old. They raced every Sunday, but Tony did not let her compete until she was able to complete five laps without crashing.

A few years later, Vicky won the I-main at the U.S. Indoor Champs—her first big win. She told her father then that she would one day win the A-main there. It's amazing how things have a way of coming full circle. She continued to race regularly, and with the help of superspeedway legend Bud Bartos, she started to turn faster lap times. Vicky is now happily married to Mike, and the couple has been blessed with a baby boy. I say the kid is going to be a world champ someday.



1/12 MOD. After an extremely clean start, Team Associated/Reedy driver Jon Orr, Team CEFX/Peak driver David Spashett and Team Associated/Reedy driver Barry Baker lead the freight train around the first couple of laps. The leaders settled into an immediate groove because it was a long 8-minute race, and none of them wanted to risk dumping on the last few laps because they had used too much battery power early in the race. Amazingly, the leaders continued in this order for pretty much the entire race, but there was a lot of shuffling behind them. As the clock ticked down the last 60 seconds, the situation tightened up. Baker, who had been on cruise control, made a charge on Spashett's car and passed it on

in the race. At the tone, Calandra crossed the transponder loop first to claim the championship, and Vanwagner ended up taking second place after crossing the line a nanosecond in front of Esposito, who had to settle for third.

the back straightaway to take over second. Spashett wasn't content with third, so he answered back with some of the race's fastest lap times and made it clear that he was still in contention.

NEW IN THE PITS



TRINITY REFLEX 12 & REFLEX 12 OVAL

Trinity had two new 1/12-scale race cars on display at the trackside hobby shop. The new Reflex 12 cars have a super-low center of gravity (CG) theme going on. According to Trinity, the suspension is optimized for use with ultra-low-profile tires for improved handling. The new low-profile motor pod holds the motor 0.050 inch lower than in the previous SwitchBlade cars, and the battery's position is fully adjustable. The cars also include a balanced, left-side clamping hub and a lightweight diff hub with large locking rings. Although they aren't shown here, the cars also have super-low-profile foam bumpers with wide front body mounts for maximum downforce and durability.

TRINITY BLUE FAN CAR STANDS

Check out this new car stand from Trinity. It has a huge fan to cool off your motor and batteries after a race, and the fan lights up neon blue when you plug it into a battery pack. The universal car stand is shown here, but Trinity offers Blue Fan car stands for the Team Associated TC3 and Team Losi Triple-XS and other stands that will fit just about any vehicle.



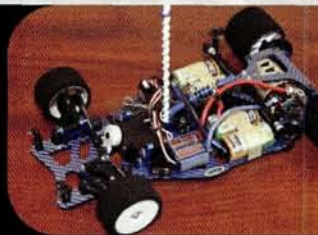
CORALLY SP12M FRONT SUSPENSION-ARM OPTIONS

Now you can outfit your SP12M with aluminum independent front suspension arms or a beam-style front suspension that acts kind of like a swaybar. The suspension arms are CNC-machined for exceptional strength and will be anodized in gunmetal gray for awesome looks.



IRS RUG RAT RC12L3 CONVERSION

This cool-looking car is an Associated RC12L3 with a complete IRS Rug Rat conversion. The conversion kit includes the blue graphite chassis, suspension and pod pieces, machined Delrin damper tubes and battery retainers. The one shown here is equipped with IRS optional aluminum servo mounts, adjustable upper arm mounts and diff accessories. Many pro on-road racers swear by their IRS accessories.



SILVA RACING STEEL T-BAR & ALUMINUM VCS SHOCK BODIES

Well-known oval racer Duane Silva now has his own line of performance accessories for the Team Associated RC12L3 on-road and oval race cars. The steel T-plate is ultra-stiff, it has a better "memory" than a fiberglass T-plate, and it's ultra-durable. The Silva Racing aluminum shock bodies are available in blue-, silver- and hard-anodized and are sold individually and in complete kits. The Silva T-Plate and shocks are available through IRS.



CEFX 12

The all-new, 1/12-scale, 4-cell CEFX 12 race car is designed and manufactured by veteran racer Josh Cyrul. The car features an ultra-low-CG rear pod design, a narrow graphite chassis plate and an independent-beam front suspension. Three mounting positions are available for the front O-ring-damped shocks, and the car has a longer T-plate for improved pod movement and less dragging on carpet. The steering servo is mounted super-low so that the servo-saver protrudes through an opening in the chassis. Even the side damper tubes are mounted as low as they can be to go with the low-CG theme. Peak Power Flow driver David Spashett piloted a preproduction CEFX 12 to an impressive second place in the 1/12 Mod A-main.



WINNERS

1/12 Stock

Fin/Qual	Driver	Chassis	Battery	Motor	ESC	Radio	Tires	Body
1/5	Vicky Blackstock	Associated 12L3	Power Push	Handout	Novak	KO Propo	CRC	Parma
2/6	Jeff Dayger	CRC Carpet Knife	SMC	Handout	LRP	Futaba	CRC	Parma
3/1	Mo Denton	Speed Merchant	Fukuyama	Handout	Keyence	KO Propo	TRC	Parma
4/3	Mark Smyka	Trinity Reflex 12	Trinity	Handout	LRP	Airtronics	TRC	Parma
5/8	Scott Smither	CRC Six-Pack	SMC	Handout	Novak	KO Propo	Jaco	Protoform
6/2	Wayne Vince	SMC Carpet Knife	SMC	Handout	Novak	JR Racing	Jaco	Parma
7/0	Mark Calandra	CRC Carpet Knife	Pro-Match	Handout	Novak	JR Racing	CRC	Parma
8/7	Mike Dunnigan	IRS Rug Rat	SMC	Handout	Keyence	Airtronics	Jaco	Protoform
9/9	Richard Chang	Rev 3	OTEC	Handout	LRP	KO Propo	TRC	Parma
0/4	Alex Lopez	Rev 3	Trinity	Handout	KO Propo	KO Propo	TRC	Parma

1/12 Masters

Fin/Qual	Driver	Chassis	Battery	Motor	ESC	Radio	Tire	Body
1/1	Frank Calandra Jr.	CRC Carpet Knife	Pro-Match	Handout	Novak	JR Racing	CRC	Parma
2/3	Bob Vanwagner	CRC Six-Pack	SMC	Handout	Novak	JR Racing	CRC	Parma
3/2	Tom Esposito	Trinity Reflex 12	Trinity	Handout	Novak	JR Racing	TRC	Protoform
4/0	Bob Schoenau	Associated 12LE	Reedy	Handout	LRP	KO Propo	T/M	Parma
5/9	Eli Ezrow	CRC	SMC	Handout	LRP	JR Racing	Jaco	Parma
6/8	Ron Ferguson	Associated 12L3	OTEC	Handout	Novak	KO Propo	CRC	CEFX
7/5	Chuck Lonergan	Associated 12L3	SMC	Handout	Novak	Futaba	Jaco	Protoform
8/6	Junior Norton	CRC Six-Pack	SMC	Handout	*	Futaba	Jaco	Protoform
9/4	Bud Bartos	Associated 12L3	Power Push	Handout	Novak	Airtronics	TRC	Parma
0/7	Skip Starkey	CRC T-Force	SMC	Handout	LRP	JR Racing	CRC	Parma

1/12 Mod

Fin/Qual	Driver	Chassis	Battery	Motor	ESC	Radio	Tire	Body
1/1	Jon Orr	Associated 12 L3	Reedy	Reedy PT 9x2	LRP	KO Propo	Jaco	Parma
2/2	David Spashett	CEFX 12	Peak Power Flow	Peak V2	LRP	KO Propo	Jaco	CEFX
3/3	Barry Baker	Associated 12L3	Reedy GP 3300	Reedy PT 8x2	LRP	Airtronics	Jaco	CEFX
4/6	Chris Tosolini	Yokomo YC-12	Fukuyama	Reedy PT	LRP	Airtronics	Jaco	Protoform
5/8	Mike Dumas	Trinity Switchblade	Epic	Epic	Novak	*	TRC	TRC
6/9	Mike Lufaso	Associated 12L3	Reedy GP 3300	Reedy PT 9x2	LRP	Airtronics	Jaco	Parma
7/4	Chris Doseck	Trinity Switchblade	Trinity	Trinity	KO	KO Propo	TRC	Protoform
8/0	Ryan Cavalieri	Trinity	Trinity	Trinity	Novak	Airtronics	TRC	Trinity
9/5	Mike Blackstock	Associated	Reedy	Reedy	Novak	KO Prop	Jaco	Protoform
0/7	Brian Kinwald	Trinity	Trinity	Trinity	Novak	Airtronics	TRC	Trinity

Touring Stock

Fin/Qual	Driver	Chassis	Battery	Motor	ESC	Radio	Tire	Body
1/2	Alex Lopez	XRAY	Trinity	Handout	KO	KO Propo	TRC	Protoform
2/3	Bobby Flack	Associated TC3	SMC GP 3300	Handout	LRP	KO Propo	Jaco	Protoform
3/4	Raymond Darroch	Losi XXXS	Trinity	Handout	Novak	Airtronics	TRC	Losi
4/7	Wayne Vince	Associated TC3	SMC	Handout	Novak	JR Racing	Speedmind	Protoform
5/5	Martin Crisp	Tamiya	Speed Mind	Handout	Novak	*	*	*
6/6	Paul Cicciello	Associated TC3	SMC	Handout	Novak	Futaba	Jaco	Parma
7/8	Robert Love	Associated TC3	Fukuyama	Handout	KO	KO Propo	*	Protoform
8/0	Aaron Bomia	Associated TC3	OTEC	Handout	LRP	Airtronics	CRC	Protoform
9/1	Dan Miles	XRAY	OTEC	Handout	LRP	KO Propo	CRC	Parma
0/9	Chuck Lonergan	Associated TC3	SMC	Handout	Novak	Futaba	Jaco	Parma

Touring Masters

Fin/Qual	Driver	Chassis	Battery	Motor	ESC	Radio	Tire	Body
1/2	Bob Vanwagner	Associated TC3	SMC	Handout	Novak	JR Racing	Jaco	Protoform
2/1	Eli Ezrow	XRAY	SMC	Handout	Keyence	JR Racing	Jaco	Protoform
3/3	Tom Esposito	XRAY	Trinity	Handout	Novak	JR Racing	TRC	Protoform
4/4	David Morrow	Associated TC3	Power Push	Handout	Keyence	Futaba	Jaco	Protoform
5/8	Bob Schoenau	Associated TC3	Power Push	Handout	LRP	KO Propo	T/M	Protoform
6/6	Junior Norton	Associated TC3	SMC	Handout	*	Futaba	Jaco	Protoform
7/9	Mike Marshall	Losi XXXS	Power Push	Handout	Novak	Airtronics	Jaco	Losi
8/0	Skip Starkey	Associated TC3	SMC	Handout	LRP	JR Racing	CRC	Protoform
9/5	Bill Jeric	Losi XXXS	Trinity/Epic	Handout	GM	JR Racing	TRC	Losi
0/7	Steve Lafara	Associated TC3	SMC	Handout	LRP	JR Racing	CRC	Protoform

Touring Mod

Fin/Qual	Driver	Chassis	Battery	Motor	ESC	Radio	Tire	Body
1/1	Mike Blackstock	Associated TC3	Reedy	Reedy KR	Novak	KO Propo	Jaco	Protoform
2/3	Atsushi Hara	HPI Pro 4	Team Orion V-Max	Team Orion V2 7x2	Hara	KO Propo	Jaco	Losi
3/5	Paul Lemieux	Losi XXXS	Trinity GP 3300	Trinity D6	Novak	*	TRC	Losi
4/4	Brian Kinwald	Losi XXXS	Trinity	Trinity	Novak	Airtronics	TRC	Losi
5/6	David Spashett	Losi XXXS	Peak Power Flow	Peak V2	LRP	KO Propo	Jaco	Losi
6/9	Josh Cyril	XRAY	SMC	Fantom	LRP	KO Propo	Jaco	Protoform
7/7	Mike Dumas	Losi XXXS	Epic	Epic	Novak	*	TRC	Losi
8/0	Billy Easton	Associated TC3	Reedy	Reedy KR	LRP	Airtronics	Jaco	Protoform
9/2	Barry Baker	Associated TC3	Reedy GP 3300	Reedy KR 8x2	LRP	Airtronics	Jaco	Protoform
0/8	Chris Tosolini	Yokomo YR4-SD	Fukuyama	Reedy KR	LRP	Airtronics	Jaco	*

*Information not supplied by driver.



Touring Stock champs (left to right): Bobby Flack (second), Alex Lopez (first) and Ray Darroch.



The husband-and-wife racing team consisting of Team Associated/Reedy driver Mike Blackstock and his wife Vicky. Mike picked up the win in Touring Mod, and Vicky took the first-place honors in 1/12 Stock.



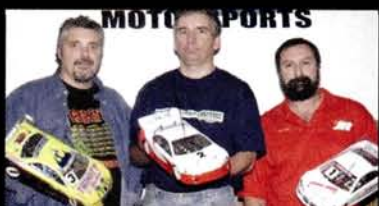
1/12 Mod class champs (left to right): Barry Baker (third), Jon Orr (first) and David Spashett (second).



1/12 Masters class champs (left to right): Tom Esposito (third), Frank Calandra Jr. (first) and Bob Vanwagner (second).



Touring Mod class champs (left to right): Atsushi Hara (second), Mike Blackstock (first) and Paul Lemieux (third).



Touring Masters champs (left to right): Tom Esposito (third), Bob Vanwagner (first) and Eli Ezrow (second).

FAST BY FUSION

Vicky Blackstock's $\frac{1}{12}$ stock win wasn't a history-maker solely because of her gender. It was also notable because her Power Push cells were assembled by Fusion Power. Instead of the traditional jig and soldering iron, Fusion Power uses an automated, low-heat/high-speed assembly process. The battery bars are special too; in addition to low-resistance material, the bars actually have heatsink fins to lower battery temps. According to Fusion Power, the assembly tech reduces performance loss due to heating during traditional hand-assembly, so a Fusion-built pack will deliver more voltage, less resistance and greater capacity than identical cells assembled the old-fashioned way. That's all been theoretical until now—with Vicky's win and four other A-Main placings by Fusion-built Power Push packs, it looks like the competition has proven that Fusion is fast.

With 30 seconds left in the race, the leaders started to bunch up. On the second-to-last lap, Baker bobbled and Spashett was right there to take over second. Just as Orr started to see the light at the end of the tunnel, there was Spashett with plenty of battery power and motor to back it up. Orr managed to close every door on Spashett as the two fought tooth and nail to the finish line. Coming out of the last chicane and onto the straightaway, the two cars made contact, bobbled a bit and crossed the line side by side.

The finish was so close that it took a minute for the announcer who manned the timing computer to reveal the outcome to the anxious racers and spectators. Orr finished with a 44/8:09.23 to take the win and the

championship, and Spashett clocked in a 44/8:09.27 to claim second—talk about close racing! Barry Baker finished third with a 44/8:12.46.

TOURING STOCK. Third-place qualifier Bobby Flack got the holeshot with his Team Associated TC3 and managed to get around TQ Dan Miles' XRay tourer and second-place qualifier Alex Lopez' XRay on the first corner. Within a few laps, Flack started to put space on Miles, who was being hotly pursued by Lopez. At the 2-minute mark, Lopez finally found an opening and got around Miles to take over second place. This apparently was part of a charge mounted by Lopez because he was soon on the leader's tail. As the front runners snaked their way through traffic, Flack got hung up behind a crashed car; Lopez seized the opportunity and charged in front. Flack quickly recovered to take over second, and Ray Darroch assumed third after Miles found himself out of the race with a broken car. Lopez and Flack battled to the very end, but Lopez managed to cross the line first to take the championship. Flack took second while Darroch hung on to third.

TOURING MASTERS: After a relatively clean start, first-, second- and third-place qualifiers Eli Ezrow, Bob Vanwagner and Tom Esposito led the rest of the pack around the first lap. Ezrow tried to make a fast break during the



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ALUM FRONT BULKHEAD
SUPPORT BLUE T-MAXX



ALUMINUM FRONT
KNUCKLE PURPLE
SAVAGE 21



ALUMINUM
STEERING
BULKHEAD
SUPPORT BLUE



ALUM LOWER SUSP ARMS ADJ BLUE SAVAGE



ALUM UPPER SUSP
ARMS ADJ PRPL
SAVAGE 21

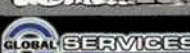


ALUM UPPER SUSP
ARMS ADJ PRPL
SAVAGE 21



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first few laps with his XRay, but he found the entire world right on his tail despite his efforts. The leaders formed a freight train as they approached traffic and snaked their way through the back markers. Ezrow managed to hold on to his lead, but he wasn't getting any breathing room from Vanwagner's Team Associated TC3 and Esposito's XRay, which were right on his tail and looking for opportunity to knock.

Ezrow and Vanwagner continued to battle while Esposito slipped back; he had his own problems as he tried to hang on to his position. Like true sportsmen, all of the other drivers pulled to the side when the leaders came by, and they left Ezrow and Vanwagner to battle it out without interruption. With less than 30 seconds left, Ezrow hit a pipe going into a corner, and his car spun around. Vanwagner wasn't too proud to collect on charity and moved right in to take the lead and, ultimately, the win. Ezrow had to settle for second while Esposito happily claimed third.

TOURING MOD. TQ Mike Blackstock got the holeshot with his Team Associated TC3 with his teammate Barry Baker's TC3 right on his tail. Team HPI/Team Orion driver Atsushi Hara and Team Trinity/Team Losi drivers Mike Dumas and Brian Kinwald were also right there each with a Losi Triple-XS. This would be an exciting race, and the first few seconds had so much position-swapping that it was impossible to know what was going on. After the first few laps, it was Blackstock, Baker, Kinwald, Hara and Dumas throwing it down and mixing it up.

Blackstock and Baker started to check out, and all attention was on the battle for third between Kinwald, Hara, Dumas, Josh Cyrul and Paul Lemieux. The leaders were putting down fast 11-second lap times, but the fastest car on the track was Hara's HPI Pro 4. Hara was laying down consistent 10.8-second lap times and was soon making his way around Kinwald to take over third. Hara was all over Baker's tail and looking for a gap large enough to allow him to squeeze past. Baker kept shutting the door on Hara, but there

HOT HANDOUTS

All the Stock and Masters classes seemed much faster this year. I'm sure it had something to do with the stock, Epic Binary handout motors given to all the Stock-class contestants. The drivers were allowed to use any motor spring/brush combination, but most elected to use the stock springs and brushes and just cut the comm after every run. The racing action in all Stock classes was faster and closer than ever.



was still 1 minute left on the clock. Could Baker keep Hara at bay?

With 40 seconds left, Hara made a move on Baker while their cars were going through the front sweeper. Baker tried to close the door but it was too late: Hara had already taken control of the line. The two cars made contact, and Baker's car veered into a pipe and broke a rear suspension arm. Baker was out of the race, and Hara was in second with Lemieux right on his tail. There wasn't enough time left on the clock for Hara to launch an assault on Blackstock, who already had the finish line in his sights. Blackstock led the entire race and took the championship by storm. Hara took a well-deserved second, and Lemieux took home a third-place trophy for his efforts. ■

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how to get more performance through gearing

Why nitro engines love good gears

by Steve Pond

I learned the value of good gearing many years ago, having been raised on electric RC racing. Of course, until recently, gearing changes in electric cars were made to ensure that you'd have enough of a battery charge to get you to the end of a race. Modern super batteries have all but eliminated any concern about run time, but all the same performance principles still apply and are practiced regularly by most electric racers.

Even though most nitro racers have a background in electric racing, they're far less likely to make gearing changes in their nitro cars. Ironically, nitro-powered cars stand to benefit the most from gearing changes. Electric motors have nearly linear power delivery; this means performance is very predictable and consistent. Nitro engines, however, have a very pronounced power curve and gearing plays a significant role in the overall performance picture. The right gearing choices can have a profound impact on performance.

GEARING FOR YOUR TRACK

Track configuration should be taken into consideration when determining gearing changes. Small tracks with tight turns and short straights call for a high gear ratio, and long tracks with high-speed straights call for the opposite. A higher ratio (bigger spur gear and/or smaller clutch-bell gear) will get you out of the corners more quickly and is well suited to smaller tracks. The higher ratio will reduce top-end speeds, but such speeds are rare on small tracks with short straights; it's a greater benefit to have stronger acceleration.

A lower gear ratio (smaller spur gear and/or larger clutch-bell gear) will result in the loss of that snappy acceleration out of the corners, but it will ratchet up the top speeds that are more suited to large, high-speed tracks.

■ **SHORT, LOW-SPEED TRACKS**—use smaller spur gear(s)/larger clutch-bell gear(s).

■ **LONG, HIGH-SPEED TRACKS**—use larger spur gear(s)/smaller clutch-bell gear(s).



For large tracks such as this one in Cincinnati, OH, racers need very different gearing from the setup they use on their local tracks. Here, standard gearing would not allow nearly enough speed on the fast sections, and that would mean slower lap times.



A 2-speed transmission can enhance performance by providing better acceleration out of the corners—without sacrificing speed.

SINGLE SPEED VS. 2-SPEED

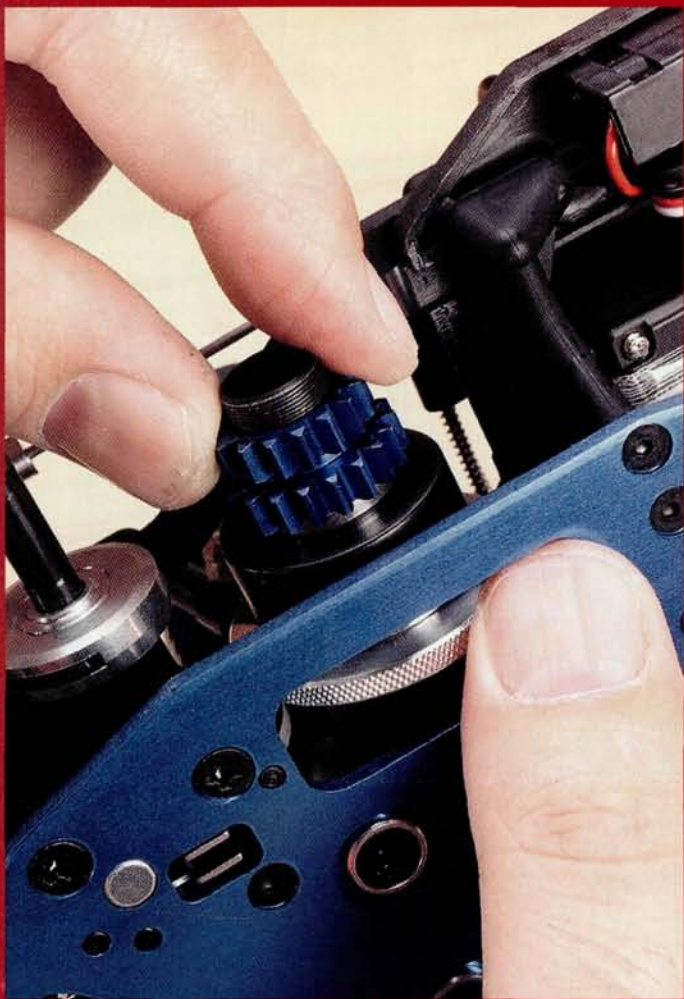
A 2-speed transmission extends the engine's "range" compared with a single speed. Adding another "gear" in the form of a 2-speed transmission can provide more bottom-end punch in first gear. Then you can switch to a higher gear for better top speed. The 2-speed transmission's extra weight and complexity may erase some of its advantages, but proper gear-ratio selection and shift-point adjustment will usually tilt overall performance in favor of a vehicle equipped with a 2-speed transmission.

Better performance doesn't equal faster top speeds. There's a common belief that a 2-speed transmission will make a car go faster. There isn't a



Vehicles with a single-speed transmission don't have as much performance range as those with a 2-speed, and that makes gear selection more critical if peak performance is to be achieved. But the single-speed setup is much lighter and accelerates more quickly as a result.

specific speed advantage to having a 2-speed tranny. If the gear ratio of second gear in a 2-speed tranny is the same as the single-speed ratio, the top speeds will be identical. A vehicle equipped with a 2-speed may accelerate a little more quickly, but the final top speeds will be identical.



Some clutches have thread-on gears that expand the range of gear ratios available and allow optimum performance on a wider variety of conditions.

RATIO CHANGES WITH YOUR 2-SPEED

A 2-speed can be fine-tuned to further increase its effectiveness on the track or in the parking lot. The presence of a 2-speed may be an advantage, but you can really kick up performance a notch or two by combining its versatility with a little gearing know-how.

For short tracks, the ratio change between first gear and second gear can be reduced. For example, let's say the clutch bell has 15- and 19-tooth gears, and the transmission has 45- and 41-tooth spurs. You can change second gear to 18 and 42 teeth respectively to give an advantage on short tracks. The closer ratios from first to second gear means stronger acceleration over a shorter distance. A larger track, however, might favor a larger spread between ratios in a 2-speed. Using the previous starting point, you can change second gear to a 20-tooth clutch bell and a 40-tooth spur. This combination would still provide the same strong acceleration out of the corners, but the larger ratio jump of second gear will extend the range on the long straights, resulting in higher top speeds.



The size difference between first and second gear can be used to tune a 2-speed transmission for longer or shorter tracks. A larger gap from first to second gear suits long tracks, and a smaller gap is better for short tracks.

■ **SHORT, LOW-SPEED TRACKS**—use smaller ratio change from first to second gear.

■ **LONG, HIGH-SPEED TRACKS**—use a larger ratio change from first to second



A range of spur gears is readily available for most vehicles. They can be used alone or combined with various clutch gears to modify gear ratios.



GEARING FOR TRACTION

Modern competition engines are more powerful than what's required in many cases and can make controlling your vehicle very difficult. We're all power hungry and instinctively go for the more powerful engine because of the misguided notion that more power always equals more speed and performance. The truth is very powerful engines compound traction problems, which usually slows lap times.

Gear-ratio changes can be used to your advantage in low-traction situations. Changing to a lower gear ratio (bigger clutch-bell gear, small spur gear) reduces the amount of power you can put to the ground and will help prevent loss of control from the tires breaking loose under acceleration. Conversely, a higher ratio will allow stronger acceleration if there's enough traction.

■ **LOW-TRACTION CONDITIONS**—use a lower first-gear ratio for better traction.

■ **HIGH-TRACTION CONDITIONS**—use a higher first-gear ratio for better acceleration.

If you have a range of clutch bells in your pit box, you'll be able to change to a low-ratio setup to make your car more controllable in low-traction situations or to a higher ratio for faster acceleration in high-bite conditions.

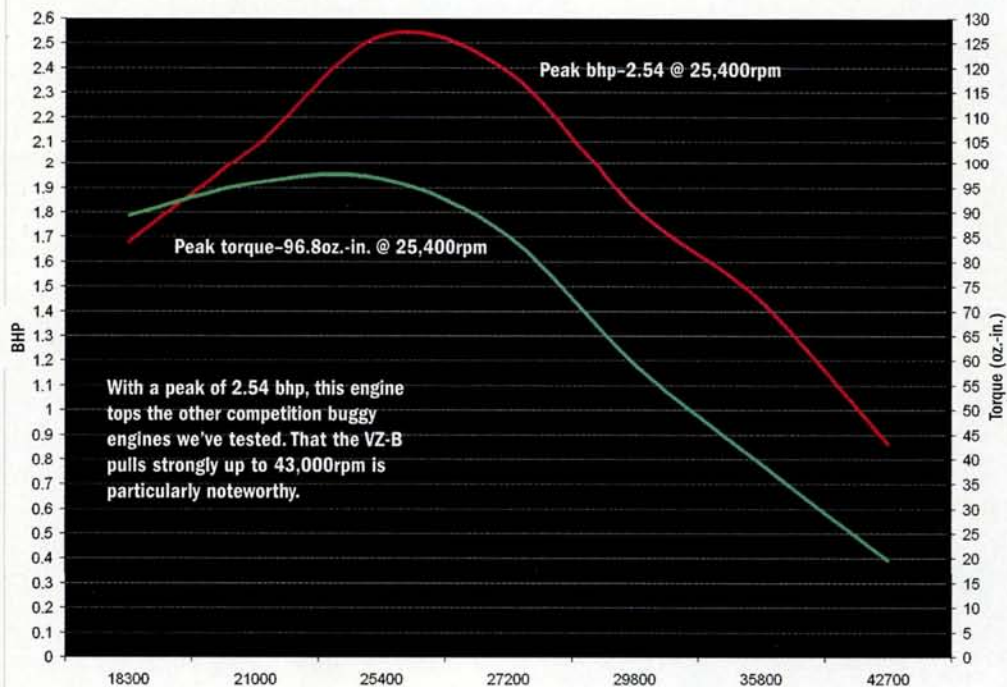
GEARING FOR YOUR ENGINE

The power curves of engines differ. Some engines have stronger low-rpm performance; others are better at making power at high rpm. Each engine has a "power band" that produces the highest amount of horsepower, and the best nitro mechanics will exploit this to the fullest; others will scratch their heads and wonder why they keep getting their doors blown off.

Power-curve information is not readily available, but ever since *Radio Control Nitro* magazine started providing dyno-test information on some of the more popular racing engines, it has more clearly exposed what experienced engine tuners have known for years: if you match your gearing to your engine, you'll be fast.

An engine that produces good bottom-end horsepower but is not strong on the top end will fall flat at higher rpm with the wrong gear. You need to gear up by installing a larger clutch-bell gear and/or a smaller spur gear. This ratio change will prevent the engine from revving too high and will keep it in the power band longer. Likewise, if you see you have an engine that really likes to rev but is lower on torque, gear down with a smaller clutch-bell gear and/or a larger spur. This will give stronger bottom end to an engine that might not have that much punch with a standard ratio, and the engine will still produce strong top end because it's a high-revving mill.

DYNO-TEST RESULTS



Engines develop power in a variety of ways. Some perform better lower in the rpm range, and others are more suited to high-rpm performance. If you select gearing that suits your engine's power profile, you'll enjoy big performance gains.

CONCLUSION

Gearing changes are the tools of the fastest nitro nuts in the world, and it doesn't matter whether you race on a track or a parking lot. Spending a little time to learn about gearing your nitro machine will pay in the form of increased performance. ■



How to turn your SportMaxx into a

RaceMaxx

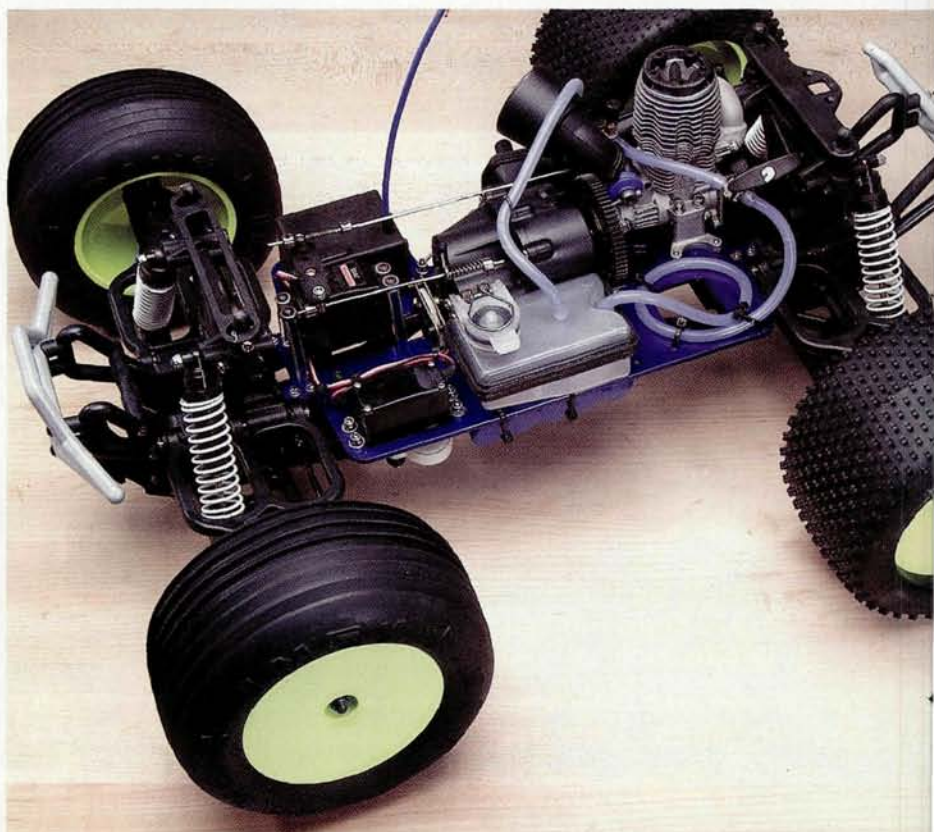
The Traxxas SportMaxx 2WD truck is easy to transform into a full-fledged T-Maxx with the 2-speed unit, the 4WD upgrade kit and the reverse setup. But that's only if you want to go the standard T-Maxx route. What about taking the SportMaxx in another direction—something a little bit different? I'm talking about turning the SportMaxx from a wanna-be T-Maxx into a full-blown "RaceMaxx." My goal is to build a truck that can hang with just about any 1/10-scale gas truck out there. Not convinced? Well read on....

THE 6 BIG MODS

1 SUSPENSION. The stock suspension works fine, but for racing, I went with a set of Traxxas' hard-anodized Big Bore shocks. These shocks are considerably smoother, provide more consistent suspension action, and they come with titanium-nitride shock shafts. Instead of using all eight, I opted to run the Slayden setup with only four (see Slayden's Shock Setups sidebar).

While I was at it, I installed a set of Teflon-coated, hard-anodized aluminum pivot balls at all four corners. The new pivot balls are considerably lighter than the stock steel units and are also much smoother. With that upgrade, both the steering response and the suspension action improved noticeably. With all the stock steel pieces swapped out for aluminum ones, a little more than an ounce of unsprung weight is shaved from the truck.

I also added a set of titanium hinge pins (replacing the eight steel pieces) to save a few more grams and add even more strength to the suspension.



2 CHASSIS. I bolted on a Traxxas 4mm 7075 T-6 chassis. The blue-anodized plate is milled out to reduce weight without sacrificing structural integrity.

parts list

TRAXXAS

- Big Bore shocks—item no. 4962
- Aluminum pivot balls—4933X/4-pack
- Titanium hinge pins—4939R
- Hi-Performance chassis—4922X
- Pull-starter for TRX 2.5—5170
- Nitro Rustler fuel tank—4448
- Aluminum throttle servo mount—4919X
- Aluminum skidplate—4947X

PRO-LINE

- Crowd Pleazer Maxx—3144-00
- Maxx Velocity wheels—2660-04
- Bumper set—6018-00

IMEX

- Maxx Rib Dawg tires (soft compound)—7421
- Maxx Pinn Dawg tires (soft compound)—7419



3 DRIVE TRAIN.

I don't plan to run my SportMaxx on many large tracks with wide-open straightaways, so I kept the tranny set up as a single-speed. If you race at small tracks that are mostly tight and technical throughout, there isn't any real advantage to running a 2-speed. If you plan to run your truck on tracks with long, wide-open straights, then by all means add the 2-speed upgrade module (item no.—5192X). Otherwise, unless your engine is revving out on top and falling flat, stick with the stock setup.

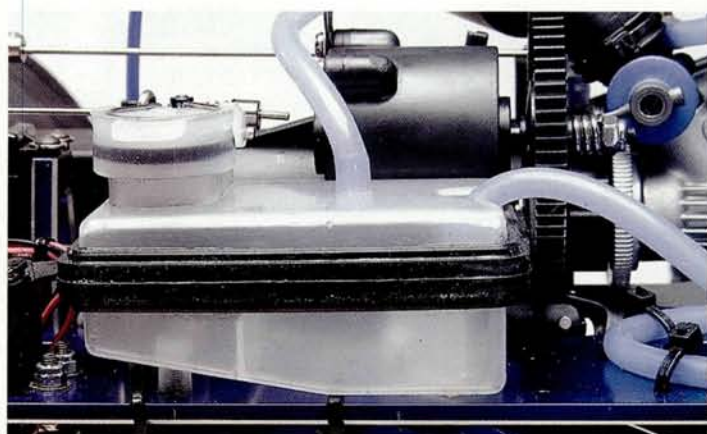
4 ENGINE.

Internally, I kept the engine bone stock; it makes plenty of power without the need to port or polish anything, so I left it alone. The only mod I made was to ditch the EZ-Start and slap on a pull-starter to shave off more weight. Removing the EZ-Start lightens the truck by just under 4 ounces.



5 FUEL TANK.

In last month's installment, I showed you how Traxxas' Steve Slayden sets up his T-Maxx for racing. One of his primary tips was to replace the stock Maxx fuel tank with a 75cc Nitro Rustler fuel tank. I opted to try that setup myself and found the truck can make an easy six minutes with the 75cc tank in place—seven minutes if I'm conservative with the throttle. Most Maxx racers usually pit for fuel at the five-minute mark, so six minutes of run time at race pace is perfect.



6 BODY, WHEELS & TIRES. I turned to Pro-Line for a Crowd Pleazer body and had it painted by the one and only Zegers RC Grafixx. For tires, I chose Imex Rib Dawgs for the front and a set of Pinn Dawgs for the rear. Since the SportMaxx is a 2WD truck, running the same ribbed/knobby setup as 1/10 stadium trucks makes perfect sense.



MORE MODS & TIPS

While I was at it, I added a few other mods to the truck to make it more race ready. Here they are, in no particular order.

- » Aluminum throttle servo mount. This mount helps to eliminate flexing under heavy braking, and that lets the servo do its job properly.
- » I incorporated another tip from Traxxas' Steve Slayden and bolted the steering servo directly to the chassis with four 3x8mm machine screws. I backed each of them up with a 3mm locknut and washer.
- » When setting the ride height, set the truck low enough to handle all the bumps and jumps on the track without sacrificing suspension travel. Smooth surfaces allow you to run the truck lower (remove preload spacers and consider adding internal limiters underneath the shock piston). Rough surfaces generally require you to run the truck with a higher stance (more preload spacers, and no internal limiters in the shock).
- » To help protect the tranny and beef up the chassis rails' strength, I added one of Traxxas' aluminum transmission skidplates.
- » When I set the slipper clutch, I fully bottomed-out the spring and then backed it off 1/4 turn at a time until it was set how I like it (roughly 1/2 turn backed off).



SLAYDEN'S SHOCK SETUPS

Traxxas' Steve Slayden has been experimenting with a four-shock setup on his own SportMaxx, so I picked his brain on how it works. Here's what he said.

"When racing a SportMaxx that weighs less than 7 pounds—1 pound lighter than a stock SportMaxx and 2 pounds lighter than a stock T-Maxx—a four-shock setup will work just fine. When going to that setup, those four shocks will now support the whole truck, so it will be necessary to go with firmer springs. For a 7-pound off-road vehicle, a medium-firm to firm 1/8-scale buggy spring works great. I use OFNA 1/8-scale white [firm] front springs for all four shocks. You could use 1/8-scale buggy rear springs, but they are too long and will need to be trimmed before they are installed onto the shocks. I recommend using buggy front springs."

FRONT SHOCK SETUP

Damper Traxxas Big Bore
Piston Two-hole
Oil Team Associated 80WT
Spring OFNA 1/8-scale buggy front white (firm)
Travel limit No limiters
Length 110mm (top of cap to bottom of rod end)
Location Upper: A (middle); lower: no. 3 (third from inside)

REAR SHOCK SETUP

Damper Traxxas Big Bore
Piston Two-hole
Oil Team Associated 80WT
Spring OFNA 1/8-scale buggy front white (firm)
Travel limit No limiters
Length 110mm (top of cap to bottom of rod end)
Location Upper: A (middle); lower: no. 3 (third from inside)

MAXIMIZER ULTRA DIFF COMBO

The new Ultra Diff can be set up as a "near posi" differential so it will give the best traction available but can still slip to prevent breakage under extreme loads. Run it up front to get the truck to pull harder out of corners with less "diffing" action. According to Maximizer, once the Ultra Diff is set up properly, it will take all the torture instead of transferring it to the tranny or drive shafts.

The Ultra Diff isn't designed to work as a slipper clutch, but it will offer more traction control. It's available separately or in a combo kit.

- Ultra Diff Combo (with modified Traxxas gear)—item no. 2326; \$80
- Ultra Diff (with Robinson Racing gear)—2327; \$94
- Standard kit (for use with the Maximizer diff kit)—2325; \$27
- Maximizer (406) 755-2828; maximizer.com



SOURCES

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piston power

expert engine advice

BY STEVE POND

How to repair your recoil starter

Pull-starters used to be temperamental and were stigmatized by experienced nitro nuts as being performance robbing and unreliable. Thanks to the huge "explosion" of nitro RTRs, pull-starters are more reliable than ever, and there's nothing more economical or convenient. Pull-starters still need maintenance though. This month's "Piston Power" is dedicated to maintenance and repair techniques for your pull-starter.

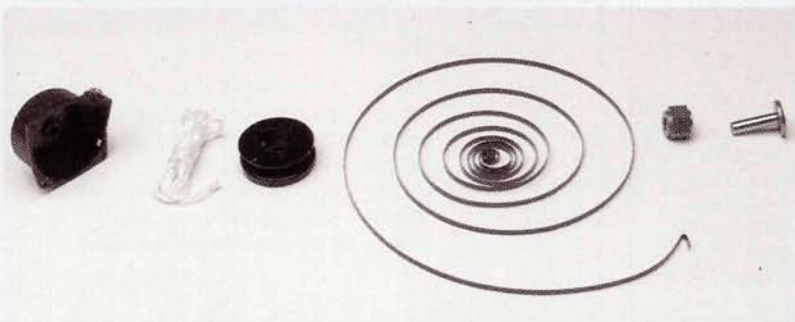


Anatomy of a pull-starter

Individual details vary, but the typical pull-starter contains these six components:

- Housing
- Pull-cord
- Spool
- Recoil spring
- One-way bearing
- Starter shaft

When you pull on the T-handle that's attached to the end of the starter cord, the spool on which the starter cord is coiled starts to spin. The one-way bearing in the center of the spool locks on to the starter shaft to turn it. The starter shaft is indexed to the engine's crankshaft, which cycles the piston through the cylinder to fire up the engine (assuming the glow plug is glowing and there's fuel in the system).



The components of a pull-starter typically include the housing, starter cord, spool, recoil spring, one-way bearing and starter shaft. The parts configuration and the installation order may change, but these are the essential elements.

After the engine starts, the starter shaft spins freely in the one-way bearing. The one-way bearing is key. For a pull-starter to operate properly, the one-way bearing needs to lock on to the starter shaft to facilitate starting, and then it must allow the starter shaft to spin freely after the engine has started. The latter isn't usually a problem, but it's common for a worn one-way bearing to slip on the starter shaft and make starting erratic or even impossible.

slipping starter

A bad one-way bearing usually reveals itself by slipping on the starter shaft. This is when you pull on the starter cord, and if the one-way bearing grabs at all, it often isn't enough to start the engine. This can usually be cured by replacing the one-way bearing, but the replacement bearing never seems to last as long. The starter shaft is often the root of the problem because some are not made of properly hardened steel. This causes the starter-shaft diameter to wear down more quickly, and that causes the one-way bearing to slip. It's best to replace the starter shaft when you replace the one-way bearing; that way, you'll get at least as much life out of the new parts as you did out of the original.



A worn starter shaft is as much to blame for a slipping starter as a worn one-way bearing. You should plan to replace both the starter shaft and the one-way bearing to restore reliable pull-starter operation.

sticking recoil action

If the starter doesn't recoil properly, it could be one of two things: there may be dirt or debris in the starter housing that prevents the spool from recoiling the cord, or the recoil

spring has broken or pulled free from the housing or spool. If it's the former, a little maintenance will clear it up. If it's the latter, you will have to repair or replace the pull-starter.

Repair or replace?

There are certain situations in which it just makes sense to buy a new pull-starter. What appears to be a simple fix might not be that simple. After you've opened the pull-starter housing to replace the starter cord or fix/replace the recoil spring, you may wish you had just gone for the new recoil unit. But if a repair is your only option, here are a couple of pointers on how to fix these two most challenging parts of a pull-starter.

Rewinding the recoil spring

Removing the spool from the pull-starter will tell you whether a new recoil spring is needed. The problem is that the recoil spring tends to burst out of the housing and becomes a tangled mess. Whether you need a new spring or not, you'll have to wind the recoil spring onto the spool so you can put everything back where it belongs. This will test your patience like nothing else, but it can be done.

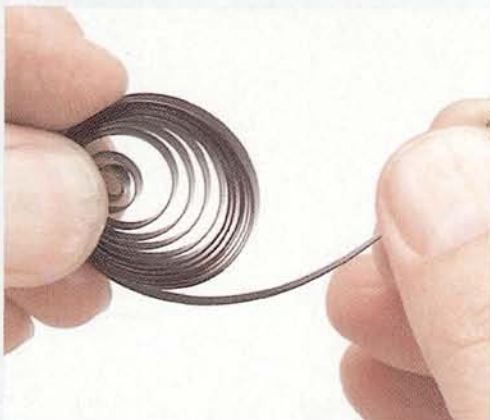
Tightly wind the recoil spring around the hub on the spool until the spring is relatively tight. There's usually a pair of aligned holes in the spool through which you can insert a skinny tool such as a hex wrench. This holds the end of the wound recoil spring in place while you install the spool in the housing. This requires a delicate touch because the recoil spring can burst into a tangled mess again without much provocation. Be prepared to try this about half a dozen times; if you can do it during the first couple of tries, you're above average.

The other way to install a recoil spring is to neatly coil it inside the pull-starter housing, then place the spool over the spring. This isn't always possible because it's often difficult to align the recoil spring with the spool, but if you can make it work, this technique is sometimes easier than winding the spring on the spool. Wind a few turns of cord onto the spool, then pull the cord and hold it while you wind a few more turns of cord onto the spool. Repeat this process until the spring recoils the full length of the starter cord but not more than that.

Both methods may sound simple, but if you make one wrong move, that cobra of a recoil spring will uncoil itself faster than you can say "#@&\$%!"



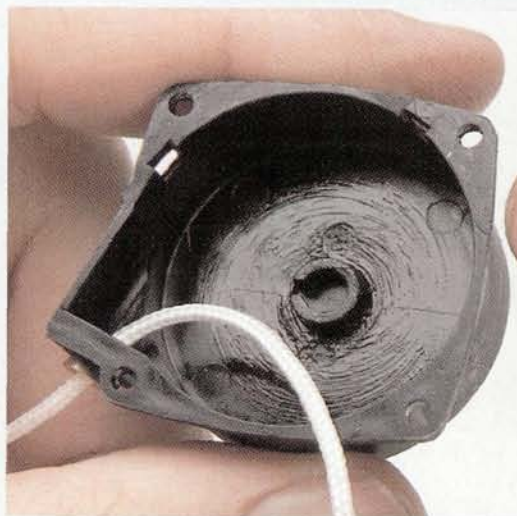
When a pull-starter comes apart like this in your hand, the best solution may be to buy a replacement.



Rewinding a recoil spring may require that you wind it by hand or around the bottom of the starter spool. Either way, this is the most trying part of pull-starter maintenance. You must maintain a firm grip on the spring to prevent it from uncoiling violently. Always protect your eyes when doing this type of work because there's no telling where the spring will go if it gets away from you.



In some starters, the recoil spring can be installed inside a recess in the spool. Rewinding the spring with this arrangement is easier than in others, but it can still be challenging.



Installing the spool with an attached recoil spring usually requires indexing one end of the spring to the housing. Tread lightly here, as the spring can easily work its way out of the spool before it's fully seated in the housing. If it does, you'll have to start all over again.



Some starter designs require that you coil the spring before you install it in the housing. Get a firm grip on the coiled spring with a pair of needle-nose pliers and then place it in the housing.



There may be holes in the spool that you can slide a hex wrench through to hold a tightly wound recoil spring in place while you line it up to be installed in the housing. This is the most unstable method, but sometimes, it's the only option besides replacement.

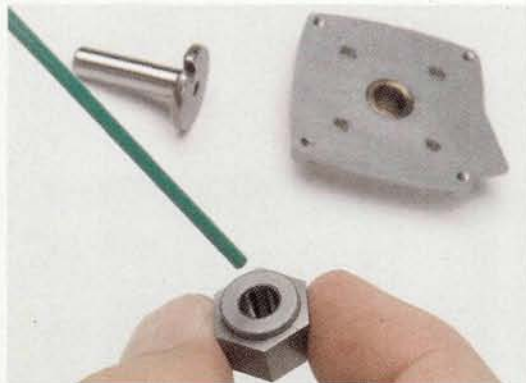
one way to treat a one-way

Successful starting requires the starter's components to be intact and functioning properly, but it's the one-way bearing that's often the most critical; if the one-way doesn't lock on to the starter shaft, you'll go nowhere. Oil doesn't usually harm a one-way bearing, but it may cause a bad one-way to slip. The only time oil is a bad thing for a one-way is when it attracts dirt and you don't clean it. It's a good practice to clean the starter assembly at least a few times during the season; clean it more frequently if you use the car or truck in a very sandy or dusty environment. Here's what to do:

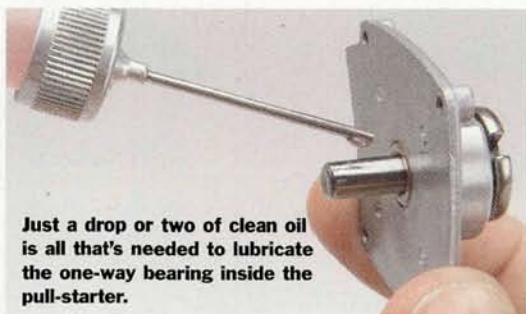
- Take the starter housing out of the engine. Make certain the spool doesn't come out of the housing; if it does, the recoil spring will explode, and you'll have to rewind it (the most annoying repair in the history of RC).

- Clean the housing, spool, one-way bearing and starter shaft with a nitro spray cleaner.

- When everything in the housing is dry, place a few drops of oil inside the one-way bearing and on the starter shaft, and reinstall the starting housing. This maintenance will help prevent the shaft and the one-way bearing from being damaged by excess dirt. The aforementioned cleaning can also help to cure a slipping one-way that has been saturated with oil from the fuel. The fix is usually temporary, however, because the root of the problem lies elsewhere.



Cleaning the pull-starter components, especially the one-way bearing and starter shaft, helps to minimize slipping of a worn starter assembly.



Just a drop or two of clean oil is all that's needed to lubricate the one-way bearing inside the pull-starter.

fixing a loose starter cord

Have you ever seen a pull-starter that doesn't recoil enough to pull the cord taut and keep the starter handle in place? This is usually because the starter has repeatedly been pulled out too far and, over time, that fatigues the recoil spring. To fix the droop, just pull an inch or two of cord out of the top of the handle (to restore spring tension) and tie a new knot. You'll be hating life if that knot unties itself and the cord disappears into the housing, so make it a tight knot and put a drop of CA on it to make sure it stays tied.

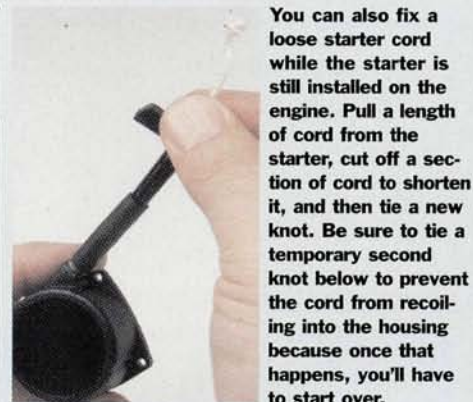
If you don't like the idea of shortening the starter cord, you'll have to open up the starter to make the fix. Pull the starter handle until there's tension on the recoil spring. Then hold the spool with your thumb and gently work the starter cord back onto the spool through the gap between the starter housing and spool. Repeat this process until you can release your thumb from the spool and the tension on the recoil spring will hold the starter handle upright.



Whether it happens over time or because of a rewinding attempt, a loose starter cord is easy to fix.



Pull a length of starter cord from the housing, and then hold the spool firmly in place with your thumb so it can't recoil. Then fish out the slack from inside the housing. Next, fish out the cord around the spool without letting the spool recoil just yet. Repeat until there's adequate tension on the starter cord when it's recoiled.



You can also fix a loose starter cord while the starter is still installed on the engine. Pull a length of cord from the starter, cut off a section of cord to shorten it, and then tie a new knot. Be sure to tie a temporary second knot below to prevent the cord from recoiling into the housing because once that happens, you'll have to start over.



After you've completely reassembled the starter, install any retainers to keep the spool in place. After you've done this once, you won't want to do it again anytime soon.



A properly assembled pull-starter will recoil enough to keep the starter handle stationary, but it won't have so much tension that the spring binds as the starter cord is drawn out of the housing. Try it out before installing it on the engine, but be very careful not to let the spool jump from the housing. ■

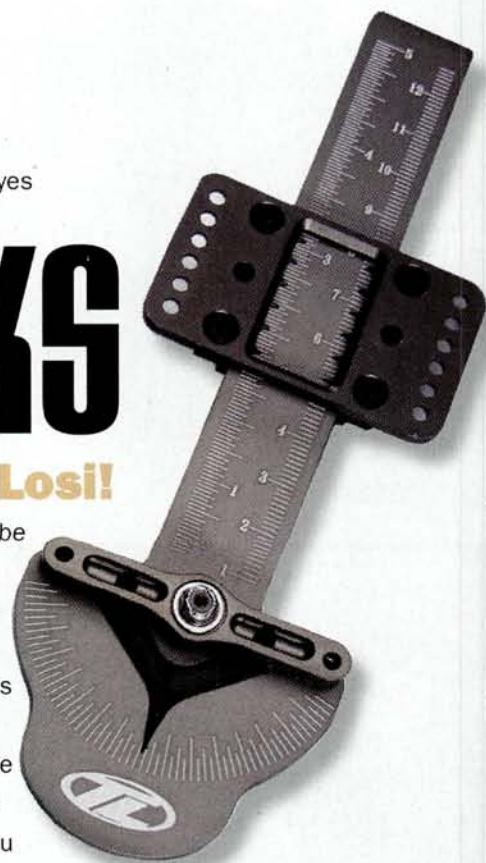


howto **match your shocks**

by Lito Reyes

Superior setup with help from Team Losi!

When you build shocks, you want them to be as consistent as they can be from side to side. No matter how carefully you build them, it's very difficult to set them up and precisely match them in the way you'd like to, and judging them with the "squish test" isn't exactly accurate. If you really want to dial in your shocks with total precision, you should check out Team Losi's new Shock Matching Tool. Team Losi's top designer, Gil Losi Jr., has been fanatical about suspension setup for many years, and he created the Tool to take the guesswork out of matching your shocks. It can handle dampers for cars and trucks that range from $\frac{1}{12}$ scale all the way up to $\frac{1}{5}$ scale. I'll show you how you can use it to set up a perfectly matched pair of shocks so you'll have one less thing to worry about when you try to find the right suspension setup for the track.



SHOCK LENGTH

Common sense and assembly manuals say that both shocks on each end of a car must be the same length. But even digital calipers can give an inaccurate measurement because they measure the length of the shock from end to end, and the most accurate way to compare lengths is to measure from the center of the upper and lower shock-mounting points. Note that the length shown on the tool's measurement indicator is taken from the center of the mounts and is not the overall length, so it may not be the same as the measurement listed on your favorite team driver's setup sheet.

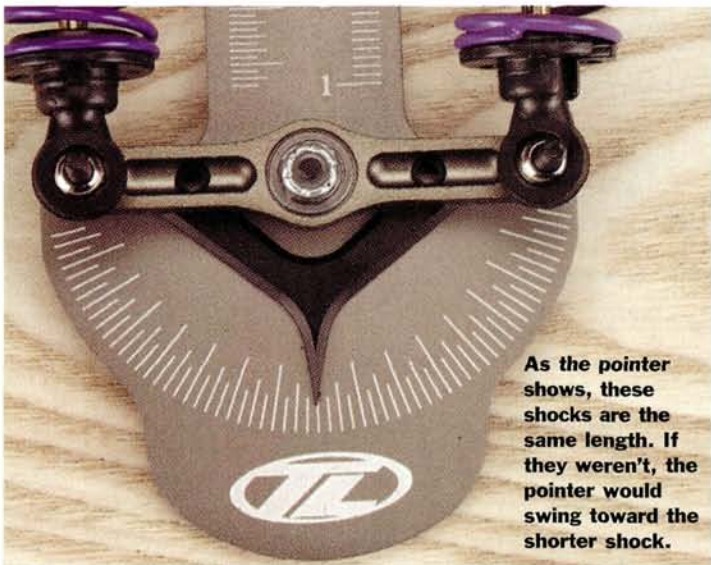
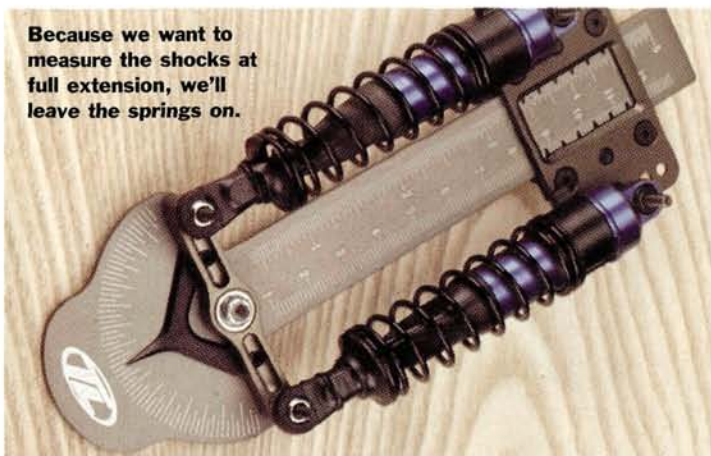
STEP 1. Mount a pair of shocks on the tool.

STEP 2. Fully extend the shocks.

STEP 3. Look at the gauge pointer; if it's centered, your shocks are the same length.

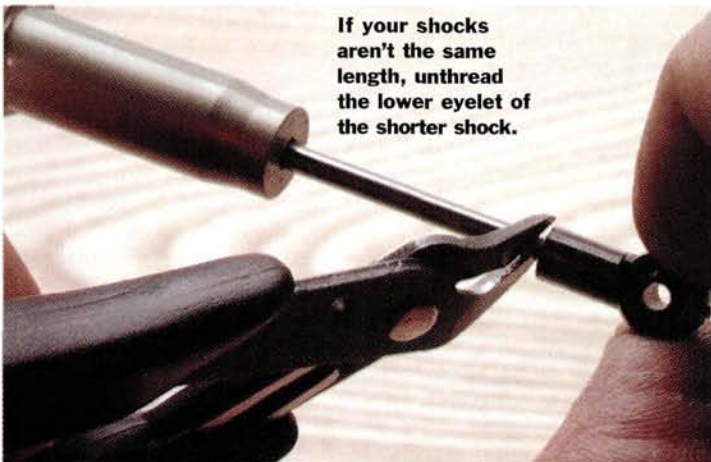
STEP 4. If one shock is shorter than the other, unscrew its eyelet until both shocks are the same length.

Because we want to measure the shocks at full extension, we'll leave the springs on.



As the pointer shows, these shocks are the same length. If they weren't, the pointer would swing toward the shorter shock.

If your shocks aren't the same length, unthread the lower eyelet of the shorter shock.



PROPER BLEEDING

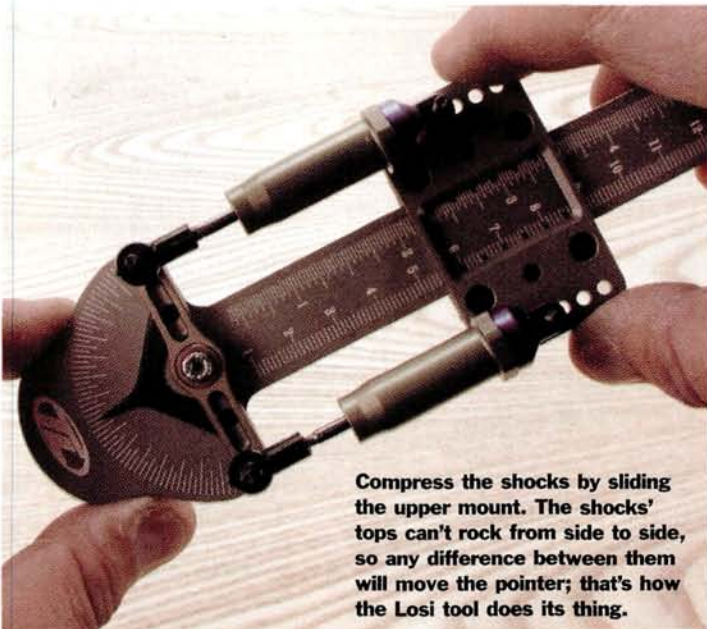
A shock that has too much fluid in it will be harder to compress fully; a shock that has too much air in it will move more easily at the end of its travel. When you build or rebuild your shocks, you should take care to bleed them evenly, or unpredictable handling might be the result. Here's how to test the shocks.



STEP 1. Mount the shocks on the tool without the springs.

STEP 2. From a fully extended position, compress the tool. While the shock shaft is being compressed, the pointer will move away from the shock that has more fluid in it. If one shock or both of them become easier to move) just before they are fully compressed, it means there's a significant amount of air in the system. When you feel the change in pressure, the pointer will suddenly swing toward the shock that lacks fluid. Keep in mind that properly bled shocks don't have much rebound. When compressed without springs, the shock shaft should self-extend only a couple of millimeters. If it extends any farther than that, there is too much fluid, and it if doesn't extend at all, there may be too little fluid.

Make sure the shocks are the same length before you use the tool to compare their damping force. If you don't, the reading won't be accurate.



Compress the shocks by sliding the upper mount. The shocks' tops can't rock from side to side, so any difference between them will move the pointer; that's how the Losi tool does its thing.

CHECKING WORN O-RINGS

O-rings that are worn won't create a good seal around the shock shaft and could let fluid out of the shock, or worse—dirt in. The tool can at least help you find out how the O-rings are holding up.

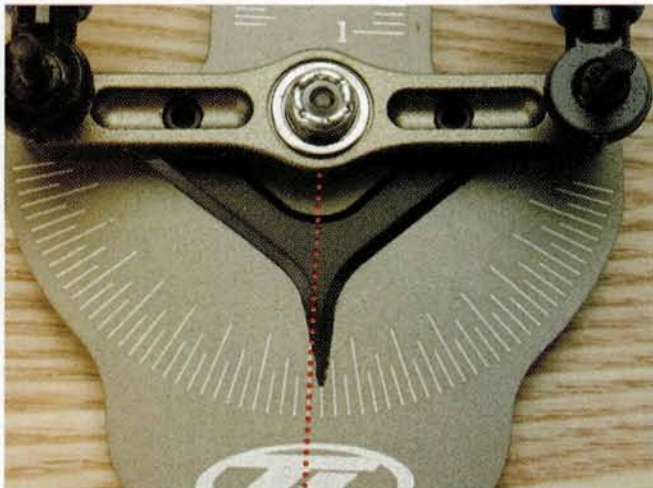
STEP 1. Remove the springs and fluid from the shocks. It's best to also remove the piston, but the seals on some shocks may be damaged if the shocks are fully extended with just the bottom E-clip on the shock shaft.

STEP 2. Install the shocks on the tool without the springs installed.

STEP 3. From a fully compressed position, extend the shocks almost to full extension. The gauge indicator will point toward the shock with the better O-rings. If the indicator points dramatically to one side, you might want to replace the O-rings.



Completely drain the fluid out of the shocks before you measure O-ring and/or piston drag. The parts should stay wet, but you don't want standing fluid in the shocks.



The tool is highly sensitive. Here, the pointer shows that the right shock has a slightly better O-ring seal. We added the red line to show dead center. You can see the pointer is only off by one increment.

MATCHING YOUR PISTONS

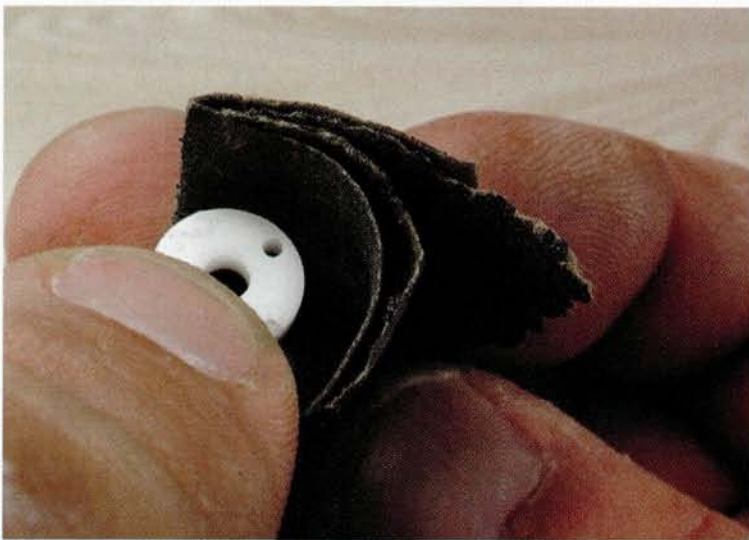
Many shock pistons come molded on a parts tree, and it's up to you to trim the excess plastic off them before you install them; even 0.5mm of material that isn't cut away properly can cause extra friction inside the shock. With Losi's Tool you can also match your shock pistons so that two will function identically. It's best to do this with a fresh set of O-rings, so match your pistons during the initial building or during a rebuild.

STEP 1. Assemble the shocks without fluid or springs and mount them on the tool.

STEP 2. Compress and expand the shocks. The gauge indicator will point away from the shock that has more piston drag during the compression stroke and toward the one with more drag during the tension stroke.

STEP 3. Remove the piston that shows more drag, and carefully remove any excess material by lightly sanding the edges; a Scotch-Brite pad does an excellent job of smoothing the edges of the shock piston.

STEP 4. Remount the shock and test it until the indicator stays centered during expansion and compression.



Don't go crazy when you sand the pistons. Knocking off the burrs left after the molding process is usually all it takes to eliminate any piston drag.

MORE TIPS FOR THE TOOL

- Keep an extra set of shock mounts handy so that you won't have to remove the ones from your car when you use the tool.
- If you run cars that use a mixture of metric and Imperial hardware, also set aside a set of metric countersunk screws and matching nuts to mount on the tool when you match different shocks.
- Measurements will be most accurate if the shocks are mounted with the shaft parallel to the tool. You might need to use spacers on the upper or lower mounting positions, so keep a few pairs of different sizes handy. Washers will do just fine.
- The needle indicator on the tool is made of plastic, so take care to protect it, and make sure it's straight when you use it.

Team drivers will attest that the difference between a carefully built car and one that is hastily put together can be the difference between making the A-main and sucking it up in the B-main. Losi's Shock Matching Tool lets you use some of the same techniques as Losi's Team drivers use to get their cars to consistently perform at their best. The downside is that now it will be harder to blame bad shocks for your poor showing at the track.

SOURCES

TEAM LOSI distributed by Horizon Hobby Inc. (800) 338-4639; teamlosi.com; horizonhobby.com.



4x4

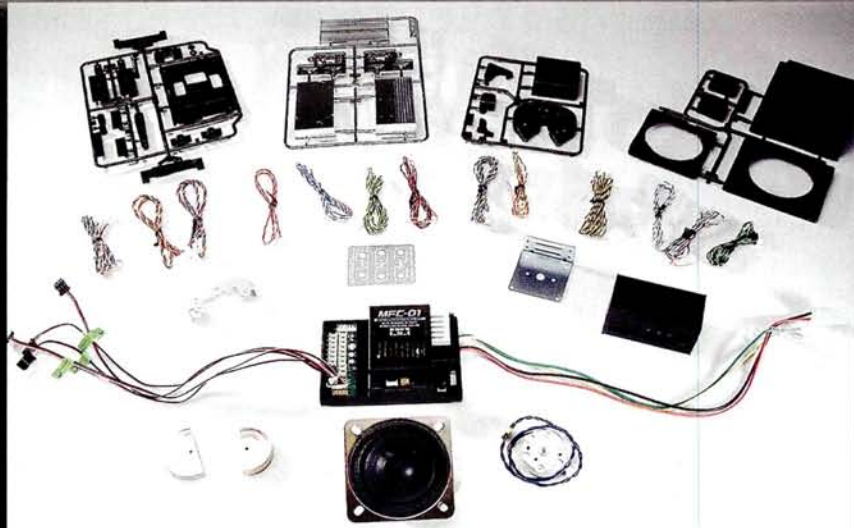
the truck stops here

BY KEVIN HETMANSKI



Lights! Sound! **Knight Hauler!**

It's hard to imagine that Tamiya's line of super-detailed tractor-trailers could get any more "real," but there's one major modification that will make the neighbors think you've aimed a shrinking ray at a full-size semi and zapped it down to $\frac{1}{14}$ scale. Tamiya's new MFC-01 Multi-Function Control Unit adds authentic diesel-engine sounds, cab shake and operational lights to your truck, all controlled from the transmitter. The MFC unit even operates Tamiya's trailer with motorized support legs. I just got my hands on one of these units and installed it in my Knight Hauler to see how it works.



What you get

When you open the box, you'll be greeted by a ton of goodies: the MFC-01 unit, a speaker, a vibration ("shaker") unit, three harnesses, a coupler switch and 20 LED lights. Tamiya also provides molded-plastic parts that allow you to install the system in any Tamiya rig with the exception of the Knight Hauler (it already includes all the necessary parts you need to install the kit). You supply only the truck, two servos (three, if you have the trailer with motorized support legs) and a 4-channel radio. Tamiya's manual recommends a Futaba Attack 4-channel radio; I used a Futaba Skysport 4 in my truck.

Here are a few of the parts that come in the box. Tamiya provides everything you need to install the unit in any of its tractor-trailer trucks.

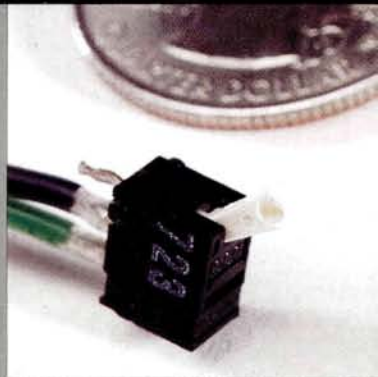
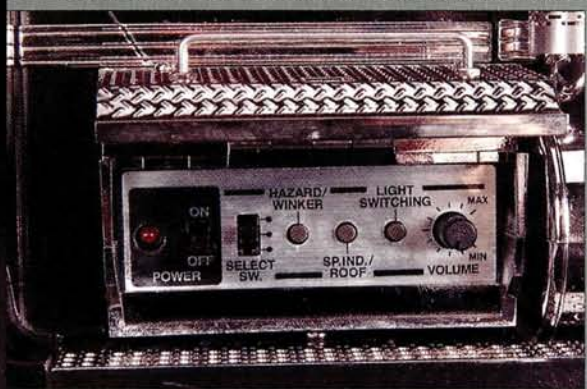
MFC-01 unit

The MFC-01 unit controls 24 sound effects and nine light functions. A small control unit controls all the manual functions of the unit. It's separate from the MFC-01 unit and gets mounted in easy-to-access spots on each of Tamiya's rigs. On the Knight Hauler, it's mounted on the inside left diamond-plate toolbox. From the small control unit, you can adjust the volume of the speaker, turn the truck on and off, change the electrical effects, switch the lights, change the mode of the roof lamps and switch between hazard lights and turn signals. The MFC-01 unit also doubles as an electronic speed control, so if your

truck already has an ESC installed, toss it aside because you won't need it.

A small switch is mounted on the fifth wheel; it tells the unit when the trailer has been attached. When you connect the trailer, you'll hear the cool sound of a real rig clacking into place! The switch also adjusts the power output of the ESC; when you've connected the trailer, it boosts the power going to the motor.

Here's the small control unit that comes with the kit. It's mounted inside the diamond-plate toolbox on my Knight Hauler.



Check out this tiny switch. Attached to the fifth wheel, it tells the multifunction unit when the trailer has been hooked up. As you hitch up the trailer, the sound system plays an actual sample of a full-scale trailer-hitching. Once the trailer is connected, the multifunction unit boosts the power going to the motor to make up for the added weight of the trailer.

parts list

- Knight Hauler—56314; \$350
- MFC-01 unit—56511; \$320
- Tractor truck oil shock—56503; \$24/pair
- Aluminum rear wheels—56509; \$40/pair
- Aluminum front wheels—56508; \$40/pair
- Motorized support legs—56505; \$60
- Semitrailer kit—56302; \$300
- Semitrailer light kit—56502; \$38
- Futaba Attack 4-channel radio—4VWD; \$110
- Trinity 3000mAh sport pack—RC3107; \$95
- Total cost—\$1,377

How it works

You may wonder how you'll operate all that stuff with a 4-channel radio. The MFC-01 unit turns your 4-channel radio into a 9-channel unit by using the trim levers to change the function of each channel. For example, to operate the horn and the motorized support legs, leave the trim lever in neutral, and move the stick up or down. Move the trim lever down to switch the headlights, roof lamps and fog lamps on and off. The most crowd-pleasing function is simply slaved to the throttle channel. As you apply the "gas," the sound of a real diesel engine rises and falls to match the electric motor's rpm. At the same time, a "shaker" makes the cab vibrate realistically as if a Cummings turbo diesel were under the hood. The shaker is simply a counterbalanced weight attached to the output shaft of a micro-motor. Like the engine-sound effects, the shaker is synchronized to the Knight Hauler's speed.



MY RADIO SETUP

- A** Trim tab up
Up stick—hazard/turn-signal switching
- Trim tab down
Down stick—lights on/off
- Trim tab centered
Up stick—long horn
Down stick—short horn
- B** Steering
- C** Trim tab right
Right stick—light/fifth-wheel switching
- Trim tab left
Left stick—engine rev on/off
- D** Throttle, brake and reverse

click trip

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Crammin' it all in

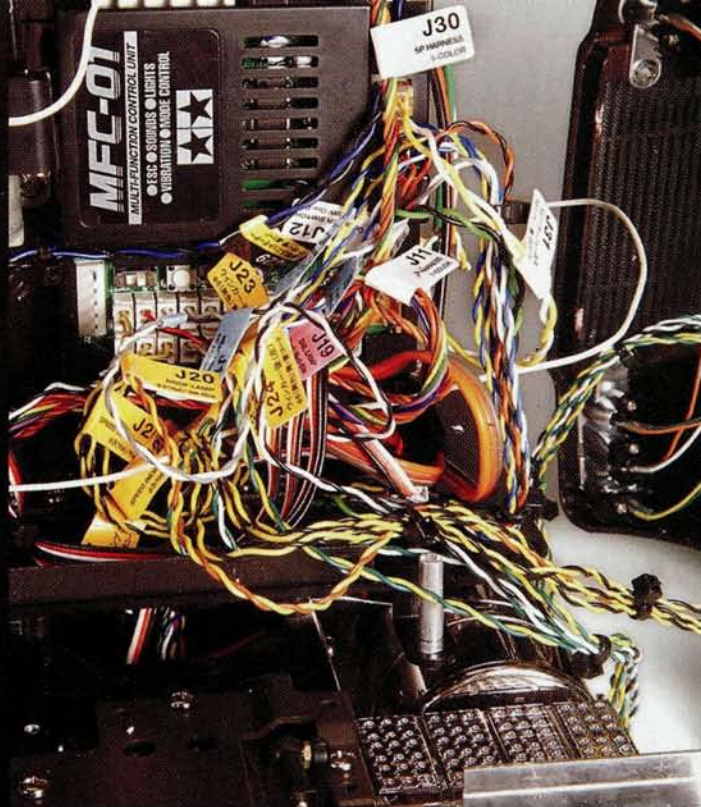
Tamiya's big rigs are indeed big, but with all the gear you need to fit into the cab, space gets very tight, very quickly. There are lots of wires to route and components to connect, so the job can get a little hairy; but with Tamiya's instructions and these tips, you shouldn't have a problem getting it all together.

NO POINTS FOR SPEED. You're not in a race to get this unit installed in your rig; I highly recommend that you take your time. Spend an evening and sort out all the wiring, another evening to install the lights on the chassis and so on. Doing it right is way more fun than rushing and doing it wrong.

TAG IT! Tamiya includes a sticker sheet with tags for all the lights, switches and wiring harnesses. Use them! When you've installed all the lights in the chassis and on the body, you'll never know which plug goes where unless you tag 'em. Place the tags on the plug ends of the wires.

ZIP-TIES ARE YOUR FRIEND. Tamiya includes zip-ties with the kit, but not enough, if you ask me. I picked up a bunch at the hardware store and used them every 2 inches or so when I bundled the wires.

DON'T TUG ON THE WIRES! To pop out a plug, don't yank on the wires, or you may rip them out. Instead, use a pair of needle-nose pliers or tweezers to remove the plug.



Now can you see why I told you to use the included tags. I think there's less wiring in the space shuttle!

Other mods

Since I had to take my truck apart to install the MFC-01 unit, I decided to install the rest of Tamiya's optional parts for my Knight Hauler. Here's what I added:

OIL SHOCKS. The stock shocks look great but don't provide any damping at all, so I installed a set of Tamiya's oil-filled shocks. They're machined out of aluminum and blue-anodized. The O-ring seals are preassembled in each shock body, and Tamiya includes a bottle of shock oil with each pair.



Tamiya's optional oil dampers are a nice way to add some style to your chassis.



Man, these rims are sweet. They are machined out of aluminum, and the included cap covers the nasty wheel nut.

ALUMINUM RIMS. The stock chrome rims are very nice, but nothing looks more like an aluminum wheel than an aluminum wheel. These wheels look great and come with caps to cover the ugly (and un-scale) wheel nuts that hold them on. The wheels come with tires already installed, so all you have to do is pull off the old and put on the new (tires and rims, that is).

TRAILER. I built up Tamiya's semitrailer kit for my rig to pull around. I painted all the panels black to match my Knight Hauler and also added Tamiya's light kit and motorized support legs.

In the end

At about \$320, the MFC-01 unit isn't cheap, but it is the ultimate accessory for the most realistic RC trucks in the world. You really have to see it to believe it (and you can see it at rccaraction.com), and once you do, you'll agree: no one does trucks like Tamiya.

SOURCES

FUTABA distributed exclusively by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; futaba-rc.com.
TAMIYA AMERICA INC. (800) 826-4922; tamiyausa.com.
TRINITY PRODUCTS INC. (732) 635-1600; teamtrinity.com.

TALK TRUCK! Send your "4x4" questions and comments to Kevin Hetmanski, kevinh@airage.com.



body shop

secrets from the paint booth

BY JOSH THIEL

Colors to Flip for!



Parma's Faschange and Fasflip paints are a great way to create trick colors and ghost effects. Fasflip shifts, or flips, through a range of colors, while Faschange makes a single high-lighted color pop out as the body moves.

Parma's Faskolor Faschange and Fasflip paints allow you to produce high-tech color-shifting effects like those made popular by the "ChromaLusion" paints created for the full-size Bigfoot monster truck, the Mustang Cobra and many custom cars. Like Du Pont's ChromaLusion paint, Faschange paints change color with changes in light. Faschange and Fasflip come in many colors but the paints all look off-white because of their thinly hued carrying media, but when they're applied and then viewed from differing angles, the pigments flash in colors such as red, blue and green. This month, I'll show you how to create some cool effects using Parma's chameleon colors.

2 WAYS TO USE FASCHANGE AND FASFLIP

CHAMELEON EFFECTS. Use this trick to change color on an entire body or over a large section. You can easily mix Faschange/Fasflip with other paint to make that color appear to shift slightly as the body moves. This works best when you mix it with darker colors. Black works especially well, as do silvery shades; they cover the Faschange/Fasflip off-white color yet allow the color-shifting pigments to be seen. Faschange has only one hidden highlight; for example, Faschange Blue provides a subtle hint of blue in certain lights. Fasflip paints, however, give a range of colors as the light changes.

GHOST EFFECTS. To create ghost-effect graphics, just spray on a very light coat of Faschange or Fasflip and then back it with a darker color in a similar tone. The treated design will be hidden by the background color and will "surface" only when viewed from certain angles, in a ghostly "Now you see it, now you don't" way.

The Basics of Faschange and Fasflip

The easiest way to achieve special effects is to thoroughly mix Faschange/Fasflip with a standard Faskolor, which ensures paint compatibility. Here are some tips:

- To paint a fairly small area, you can mix the paint right in your airbrush paint cup.
- Test-spray the mixture before you start on your body to be sure the paints are thoroughly mixed.
- Keep in mind that Faschange/Fasflip will lighten any color you mix it with. With black paint, I use about a 10:1 ratio of Faschange/Fasflip to black. You can mix other colors at closer ratios; it is best to start with a large amount of Faschange and then add color until you reach the tint you like.

For custom effects, you can easily mix Faschange/Fasflip with other colors. Add another color until you have the shade you want.



color-change paint in use

To create this month's body scheme, I wanted to add a subtle yet sharp-looking effect to the Pro-Line Aston Martin Vantage. Color-shifting sprayed-on ghost flames seemed to be the perfect trick. I did this by using two flame versions: one with a positive foreground pattern and the other with a negative background pattern. In the positive-foreground version, the flame pattern contains the color-shifting Faschange paint, and the surrounding area is a standard but matching color. On the negative background, the flame does not change color but the surrounding area, or background, does. Here's what I did:



Painting the forward portion of the flame first creates positive flames.



To create "negative" ghost flames, paint the background area first with a color mixed with Faschange. You need only a light coat of it.

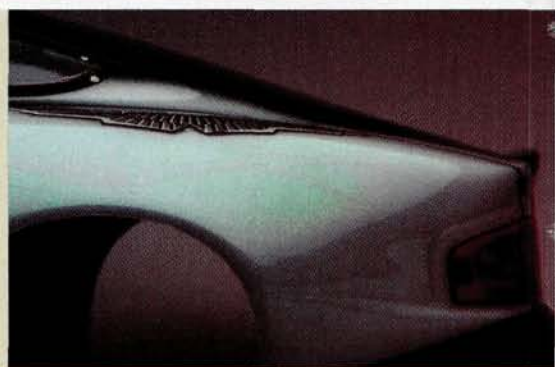
- After the usual prep cleaning, I coated the Aston Martin in liquid masking and drew a flame pattern on the outside.
- I cut the masking by tracing along the flame pattern with hobby knife equipped with a fresh blade.

■ To create a positive flame pattern, I removed the masking from the center of the flame itself. I then lightly misted Faschange into only the tips of the flames and then backed them with white. This produced a colored flame that "pulls out" from the body. The more heavily you apply the Faschange, the more pronounced the effect will be.

■ To make a negative flame pattern, remove the masking from around the flames, and on the background only, repeat the same process as before. Then paint the background and the faces of the flames white. This will produce flames that look set back into the body color.

These methods create a ghost-like effect because Faschange is blended into the background. Other ghost variations can be made with flat paints. The general idea is to have an effect that isn't immediately apparent. If you use regular paint, mix up a slightly different shade of a color and apply it against its original using these techniques. Pinstripes also add excellent highlights to ghosted effects.

From indirect angles, Faschange blends into the background like this Fasflip Jade/Black mixture.



The trick ghost flames are so subtle that we had to really "bump up the volume" so you can see them. We enhanced the color levels on the negative flame pattern, so check out the design on the Aston Martin Vantage's left rear-quarter panel.



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CONCLUSION

By themselves, Faschange and Fasflip might not be colors that jump out at you, but with a little ingenuity, you can create some killer looks with these chameleon paints. As with any paint-related project, plan the steps, and experiment with different techniques until you have a ride that stands out from the pack. Keep painting and have fun.



SOURCES

PARMA/PSE (440) 237-8650; parmapse.com. PRO-LINE (909) 849-9781; pro-lineracing.com.

new in the shop

Powers Hot Works Racing Factory Wheels with disc brakes

You weren't going to put your masterpiece body on a car with a set of dull dish wheels, were you? Hot Works Racing Factory Wheels come in a variety of styles and colors and include detailed "disc brakes" to go behind the rims plus matching wheel nuts.

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Powers Hot Works; distributed by Schumacher USA (813) 889-9691; racing-cars.com.



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Hitec RCD Inc. **HIS-03MK programmable receiver**



HITEC'S NEW HIS-03MK FM 3-channel programmable receiver incorporates many new features not normally found in a typical receiver. The standout feature of the HIS-03MK is that it's programmable with its Intelligent Pulse Decoding (IPD)—a built-in fail-safe. But the receiver also has other cool highlights such as a low-battery warning, Direct Servo Control (DSC), power LED and an Auto Shift feature that makes this signal grabber compatible with all transmitters.

MANUFACTURER'S SPECIFICATIONS

Channels 3
Conversion type Single conversion
Frequency 27MHz FM and 75MHz FM
Operating voltage 4.8 to 6 volts
Current drain 15mA +/- 0.15mA
Max. BEC output 3 amps
Size 1.5x1.0x0.6 in. (39x26x17mm)
Weight 0.6 oz. (17g)

OPERATION

Although the HIS-03MK offers much more in terms of features than a standard receiver, it is no more difficult to install and operate than any other receiver. After the HIS-03MK is taped into place and the appropriate plugs are installed, it literally takes one second to program the fail-safe setting that the receiver will send to the throttle in case of signal

loss. You can also elect to use the Hold mode; this has the servos hold their last positions in case of signal loss. So if the throttle is at full throw when signal is lost, it will hold that position until signal returns. The Hold mode is also the default setting.

TESTING

Testing a receiver is pretty simple; I first did a range test and then performed a rather straightforward test of the IPD feature. For the range test, I just walked away from the car until I lost the signal. I set the fail-safe throttle position at full brake and held full throttle as I walked away. I made it approximately 800 feet before the signal became intermittent. I performed the same test with another Hitec receiver and also with a receiver from a different manufacturer. All three receivers had approximately the same range capabilities; in range, none of them consistently outperformed the others. The difference between the three receivers was that when signal was lost with the HIS-03MK, it stopped the motor; the other two receivers lost signal, and the motors erratically sputtered on and off.

To test the IPD feature, I simply turned my transmitter off while holding full throttle. After a delay of about one second, the receiver sent the throttle to the preprogrammed full brake position.

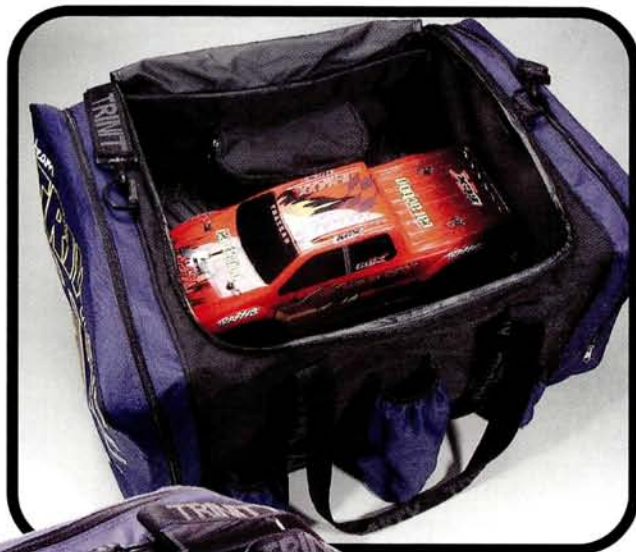
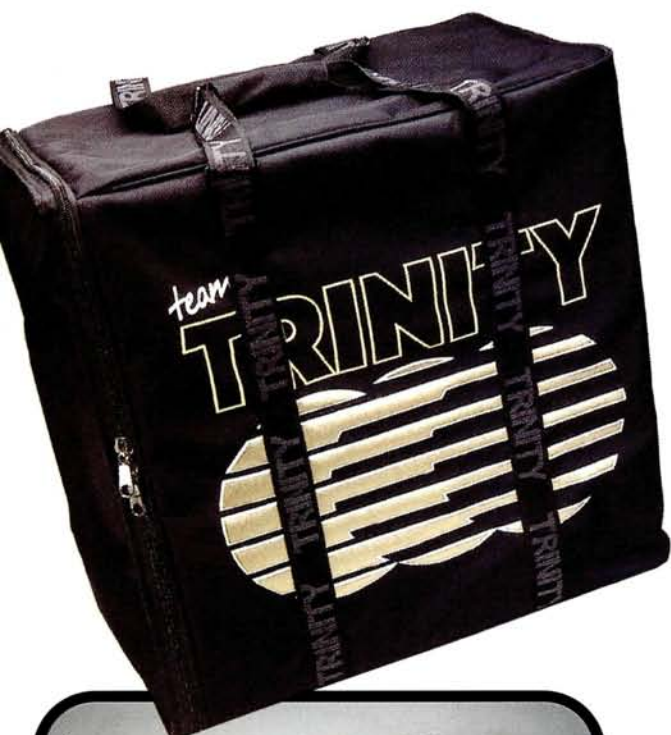
RC radios operate on either a positive or negative shift transmission. Hitec and Futaba transmitters are negative shift, and the other popular brands are positive shift. This is important to know because positive and negative components are not compatible, so a Hitec transmitter will not work properly with an Airtronics receiver, or vice versa. Although the HIS-03MK is negative shift like the rest of Hitec's radio products, it automatically changes to positive shift if you use it with a positive-shift transmitter. I tested this feature with a positive-shift JR Racing transmitter, and the Auto Shift performed as promised. The receiver instantaneously set itself for positive-shift operation and performed perfectly.

THE VERDICT

The Hitec HIS-03MK works flawlessly and incorporates some very useful features. The low-battery indicator is handy for nitro use and for 4-cell applications where a separate receiver pack might be used. The IPD feature instills a lot of confidence because you now know your RC rig won't become a runaway. The Auto Shift capability makes this little box very versatile and affords you the ability to use any receiver you choose. —Matt Higgins

Hitec RCD HIS-03MK Programmable Receiver—24927 (27MHz), 24975 (75MHz); \$55.

Hitec RCD Inc. (858) 748-6948; hitecrd.com.



Trinity Products Inc. Monster Hauler Bag XXL and Maxx Plus Hauler Bag

TRINITY'S LATEST ADDITIONS to its line of hauler bags are the biggest ones yet. The bags are made of thick nylon with heavy-duty carrying straps that are securely stitched. Large, dual-pull metal zippers glide open and closed effortlessly, and spiked rubber feet are mounted on the bottom.

The Monster Hauler Bag XXL comes with three giant internal cardboard boxes that can easily accommodate $\frac{1}{8}$ -scale buggies and $\frac{1}{10}$ -scale racing trucks. The boxes measure 13x6.7x20.4 inches. A plastic handle on each box and the smooth bag interior make it easy to remove the boxes from the bag.

The slightly smaller Maxx Plus Hauler Bag is similar to a gym duffel bag and is designed to carry monster trucks. The main compartment has four rigid sides that help to maintain the bag's shape, and a small zippered bag is mounted on one side to hold a transmitter. Large exterior compartments on the ends of the bag can hold a ton of gear, and three pouches on the outside of the bag are perfect for holding a can of cleaning spray, a fuel bottle, a can of soda, etc. An adjustable and detachable shoulder strap comes in handy to free up your hands.

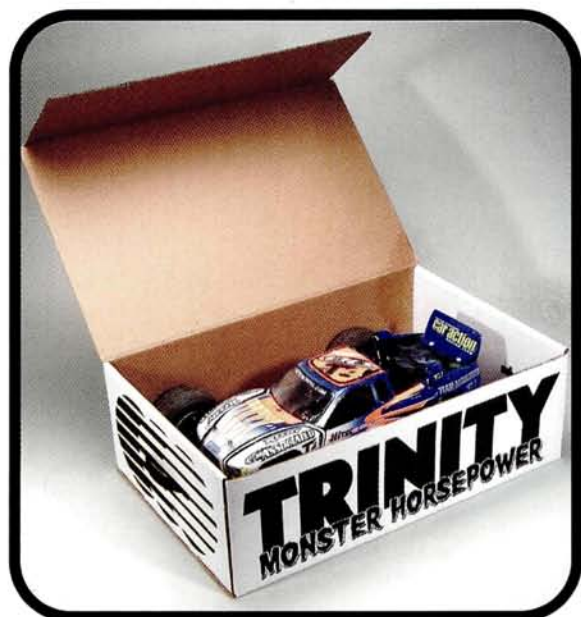
Both bags have held up very well for me with the constant trips between the office, home and track. I can carry everything I need for a day of racing in one trip. —Paul Onorato

Trinity Products Inc.

Monster Hauler Bag XXL—RC9049; \$50.

Maxx Plus Hauler Bag—RC9050; \$45.

Trinity Products Inc. (732) 635-1600; teamtrinity.com.



Dynamite Conversion kit for T-Maxx with Mach .26 engine

DYNAMITE'S T-MAXX CONVERSION kits include everything you need to shoehorn a nitro-snorting, big-block engine into a T-Maxx and the new 2.5; they are available with or without the Mach .26 engine. I tested the 2.5 conversion that comes with the engine and the kit contents include:

- Dynamite Mach .26 engine with pull-starter and slide carburetor
- 3mm-thick, hard-anodized chassis
- Hard-anodized aluminum chassis braces
- Four heavy-duty universal drive shafts
- Heavy-duty, universal center drive shafts
- Six drive cups
- Hard-anodized, aluminum, big-block engine mounts
- Polished tuned pipe and header
- High-volume air cleaner
- Essential hardware
- Photo-illustrated instruction manual

INSTALLATION

I converted my 2.5 T-Maxx with the full version of this kit in about four hours. The superb quality of the kit's parts can make a difference in the truck's performance and durability. The drive shafts have rubber boots fitted over the universals to keep dirt out, and the hard-anodized parts on the chassis plate and braces resist damage from the abuse that off-road running can dish out. The polished tuned pipe and header will increase the power of the big-block Mach .26 engine that features a pull-starter, ABC construction, slide carb and large, powder-coated heat-sink head.

The kit instructions weren't written with the novice in mind; general topics are covered, but ambiguous descriptions and vague pictures led to guesswork and head-scratching between steps. I disassembled and cleaned all of the parts from my donor Maxx. I mounted the suspension assembly first, and then added the electronics, the fuel tank, the transmission, the engine and the exhaust system onto the new longer-than-stock chassis plate. The new chassis plate increases the wheelbase 1.6 inches (40.6mm) to make room for the larger engine. In the final steps, I centered the servo trims and set the linkages. Advice for big-block beginners: take your time and be sure to install the gear mesh between the clutch bell and spur gear correctly, thread-lock all drive-train hardware, and don't forget to tighten the slipper clutch to handle the increased power. Overall, the kit went together very smoothly; I didn't have to make any major modifications to get proper fit and finish.

PERFORMANCE

The throaty exhaust of the Mach .26 made it difficult to restrain my trigger finger during engine break-in. The first few tanks of fuel didn't last long because the rich carb settings made the big-block thirsty for nitro. After break-in, I adjusted the shift points and watched the Mach .26 whip the truck around like a rag doll.

The increased chassis length helped make the truck more stable,



but the mighty Mach .26 engine can still wheelie the truck onto its lid. The mods made a difference in the truck's balance. A slight rearward shift in the vehicle's center of gravity (CG) is evident during jumps and in the increased understeer in the corners, so I adjusted the caster shims to the rear position to help compensate for the CG shift. This made the truck well mannered around the track and a very well-balanced performer.

VERDICT

Dynamite packs its conversion kits with high-quality parts; everything you need to get the job done is included and the assembly is trouble free. If you're in the market for one of these kits, and you value your dollar as I do mine, go with the kit that includes the Mach .26; it's worth the dough. The Mach .26 engine is reliable, powerful and a perfect complement to this kit. Bottom line: Dynamite has put together an explosive kit that will propel your truck's fun-factor off the charts. —David C. Konneker

Dynamite

Conversion kit for T-Maxx (without engine)—DYN7400; \$150.

Conversion kit for T-Maxx (with Mach .26 Engine)—DYN7401; \$290.

Conversion kit for T-Maxx 2.5 (without engine)—DYN7402; \$150.

Conversion kit for T-Maxx 2.5 (with Mach .26 Engine)—DYN7403; \$290.

Dynamite; distributed by Horizon Hobby (800) 338-4639; dynamiterc.com.



Du-Bro Products In-line fuel filter

IF SPENDING LESS than \$5 could protect you from blowing a \$300 engine, you'd do it, right? Right. And yet you probably still don't have a fuel filter in your car or truck. Du-Bro's in-line filter is cheap insurance against engine trouble, and the filter takes only a few seconds to install. A pair of barbs on each end



holds the fuel line (but adding a zip-tie or Du-Bro fuel-line clip to each end isn't a bad idea), and the O-ring-sealed aluminum body unscrews for access to the fine-mesh filter. You can even get the Du-Bro filter in blue, red, or purple, if silver isn't your color. After installation, you'll never know it's there, but when you open it up and see the chunks of crud that didn't make it to your carburetor, you'll be glad the filter was on the case. —Peter Vieira

Du-Bro In-line fuel filter—2305 (silver), 2306 (blue), 2307 (red), 2308 (purple); \$4.

Du-Bro Products (800) 848-9411; Du-Bro.com.



DuraTrax Ultimate Tools and Ultimate Body Reamer

DURATRAX'S NEW ULTIMATE TOOLS feature a sharp-looking, machined, blue anodized handle with a comfortable knurled grip. Stripes and the DuraTrax logo are machined into the handles to add a touch of flash, and DuraTrax engraves the tip size for easy identification. The tips are made of hardened steel and are replaceable; a single setscrew locks the tip into place. The tools are available individually as well as in sets: You can get bladed screwdrivers in 2, 3 and 4mm sizes; Phillips-head screwdrivers in 2, 3 and 4mm; hex wrenches in 1.5, 2, 2.5 and 3mm; and ball drivers in 1.5, 2, 2.5 and 3mm sizes.

The Ultimate Body Reamer has the same good-looking handle construction as the rest of the DuraTrax Ultimate tool line. The cutting tip is super-sharp and can ream holes up to a 1/2 inch. The reamer comes with a matching machined-aluminum cap to protect the blade. The cap fits on the end of the handle while the reamer is being used.

I started using the DuraTrax tools as soon as they arrived, and found the tips offer a precise fit without being so tight that they have to be forced in. The body reamer cut fast, clean holes and showed no sign of dulling after doing its thing on more than a few shells. On all the tools, the handles are comfortable and the

knurled texture is deep enough to increase grip, but it isn't so deep or so sharp that it's uncomfortable. The DuraTrax Ultimate Tool line offers a good blend of high quality and the expected DuraTrax value. Each tool costs about \$10, and each set runs approximately \$30. —Matt Higgins

DuraTrax Ultimate Tools—various part nos. and prices.

DuraTrax; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; duratrax.com. ■



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ALABAMA

Hobby Raceway, Tusculosa, Alabama 35405; Mark or Don Holt, 205-759-4517 & 205-333-8679; email: makkholt@aol.com

Mobile Miniature Speedway, Theodore, Alabama 36582; Richard Sweetser, 251-653-6643; email: jbogard@comcast.net; web: mywebpages.comcast.net/jbogard

North Cullman Raceway, Cullman, Alabama 35055; Daniel Lollies, 256-775-2491; email: cullmanhobbies@yahoo.com; web: www.cullmanhobbies.homesite.com

Oak Mountain R/C Raceway, Columbiana, Alabama 35051; Matthew Gordon, (205) 669-6837; email: oakmtncraceway@hotmail.com

R/C Hi-Tech Raceway, Huntsville, Alabama 35811; Rick Chambers, 256-539-1347

Spring Cove International Speedway, Florence, Alabama 256-757-1562; email: rvines@hiway.net; web: www.springcovespeedway.com/SpringCove.htm

ARIZONA

HobbyTown Raceway, Tucson, Arizona 85713; Jay, (520) 882-8888; web: www.hobbytown.com

HobbyTown U.S.A. Phoenix, Arizona 85044; Doug McFarland, (480) 598-5282

R/C Sports Mania, Phoenix, Arizona 85017; Gary Dick, (602) 278-3671

Scottsdale R/C Raceway, Scottsdale, Arizona 85251; Scott Anfinson, 480-945-2186

ARKANSAS

Alison Off Road RC Raceway, Little Rock, Arkansas 72206; Steve Alison, (501) 490-1227; email: jason@alisonoffroad.com; web: www.alisonoffroad.com

Grand Slam Hobby, Ft. Smith, Arkansas 72901; Bryon Shumate, (501) 648-1994; web: www.gshobby.com

Sparks R.C. Raceway, Paragould, Arkansas 72450; Tommy Sparks, (870) 239-3606

CALIFORNIA

Capital City R/C, Sacramento, California 95829; Homer, 916-383-3445; email: lanno@pacbell.net; web: www.capitalcityrc.com

Castle Hobbies, San Jose, California 95124; Steve Scott, 408-377-3771; web: www.castlehobbies.com

Crystal Park Raceway, Compton, California 90202-4925; James Reese, 310-631-0307; email: mailto:info@crystalparkraceway.com

Delta R/C Raceway & Hobbyshop, Antioch, California 94509; Rick or Steve, (925) 778-2965; web: www.deltarc.com

Extreme RPM Hobbies, Grand Terrace, California 92313; Bobby Haney, 909-370-3379; email: ExtremeRPMrace@aol.com; web: www.ExtremeRPMRacing.com

Hobby Central Raceway, Poway, California 92064; Lee, (858) 513-0373; web: www.hobby101.com

Hobby World, San Jose, California 95129; Guy Bassett, (408) 873-2109

Hot Rod Hobbies, Saugus, California 91350; Jimmy Babcock, (661) 255-2404

Jake's Performance Hobbies, Rohnert Park, California 94928; Jake, (707) 586-3375; email: jphracing001@aol.com; web: jphracing.com

Palm Desert Off Road R/C Raceway, Palm Desert, California 92260; Bob Barrett, 760-341-5699; email: htu-palmdesert@msn.com; web: www.hobbytown.com

Paradise Hobbies & RC Raceway, Paradise, California 95969; David Lafabregue, (530) 877-6447; email: paradisehobbies@aol.com

Pure Adrenaline RC & Hobby, Sonoma, California 95370; Matt, (209) 536-6232; email: contact@pahobby.com; web: www.pahobby.com

Racer's Haven Raceway, Bakersfield, California 93309; Greg Cooper, 661-835-0441; web: www.racers-haven.com

Rescue Mini R/C Speedway, Rescue, California 95672; Bruce Pease, (530) 621-3948; web: www.innercite.com/~rccracing/

Ripon R/C Speedway, Ripon, California 95366; Dan Tanis, (209) 599-5160

Sacramento RC Racing & Hobbies, Sacramento, California 95824; Andreas Muller, (916) 424-4001; email: andreas123@earthlink.net; web: www.77sunset.com

Showtime R/C Speedway, Bakersfield, California 93301; Don Risner, 661-328-1481; email: showtimespeedway@aol.com; web: www.showtimespeedway.com

So Cal R/C Raceway, Huntington Beach, California 92646; Jim or Lana, 714-963-7484; email: info@socalrc.com; web: www.socalrc.com

SpeedWorld Raceway, Roseville, California 95678; Billy Bowerman, 916-783-8864; email: speeddog@mindsync.com; web: speedworldraceway.com

The Dirt Valley R/C Racepark, Hemet, California 92544; Joe Christenson, (909) 925-7592

Ventura RoadRunners, Camarillo, California 93010, 805-564-4144; email: dudebigal@aol.com; web: www.venturaroaddrunners.com

COLORADO

MHOR R/C Raceway, Aurora, Colorado 80011; Jess A. Brockman, (303) 343-0151; email: questions@mhorr.com; web: www.mhorr.com

Valley West Off-Road RC Club, Grand Junction, Colorado 81504; Jodie Grein, 970-242-1412; email: gearhead@gj.net; web: www.gj.net/~gearhead/vworrind.html

CONNECTICUT

K&N R/C Speedway Inc., Stafford Springs, Connecticut 06076; Jim or Bill, (860) 684-9896

Manchester Hobbies, Manchester, Connecticut 06040; Jim or Mike Tierinni, (860) 643-4768

R/C Madness, Enfield, Connecticut 06082; Christopher Marcy, (860) 741-6501; email: cmarcy@rcmadness.com; web: www.rcmadness.com

SpeedZone Raceway, Cromwell, Connecticut 06416; David Kahn, 860-632-9278; email: info@speedzone-hobbies.com; web: www.speedzone-hobbies.com

Xtreme Radio Control, New Milford, Connecticut 06776; Paul or Pete, (860) 354-4703

DELAWARE

ESRC, Seaford, Delaware 19973; Bill Auchterlone, 302-734-2757/302-629-3944; email: aeromarine@erols.com

FLORIDA

B&T RC Central, Fort Walton Beach, Florida 32547; Mike or Tim, 850-863-1666

Daytona R/C Racing Assoc., Ormond Bch., Florida 32174; Mike Wichman, 386-677-0896; email: bijj@bestnetpc.com; web: daytona-rc.homeip.net

Farmers Hobby Shop & Raceway, Tampa, Florida 33619; Greg Cardone, 813-248-3314; web: www.farmershobby.com

First Coast Speedway, Jacksonville, Florida 32211; Bobby Phillips, 904-716-0861; web: www.firstcoast-toracing.com

G&C Hobby Raceway, Lantana, Florida 33462; George, 561-547-3812; email: gncobbies2@cs.com; web: www.gncobbies.com

GB's Hobbies, Port St. Lucie, Florida 34952; Track Owner, 561-460-2844; email: qaircraft@bellsouth.net

Grand Prix RC-Club, Ft. Pierce, Florida 34945; Luther Peterson, 772-473-2130; email: grandprixhobbies@aol.com

Gulf Coast RC Car Club, Naples, Florida 34105; Mark Benfield, 941-774-7116; email: teamnofear@aol.com

Hobby Central, Pensacola, Florida 32504; Bill McLester, 850-471-9800; email: info@hobbycentralrc.com; web: www.hobbycentralrc.com

Hobby World Raceway, Jacksonville, Florida 32210; Greg, (904) 772-9022

Kissimmee R/C Auto Racing, Kissimmee, Florida 34741; John Rosser, (407) 944-4913; email: john@craftworldflorida.com; web: www.craftworldflorida.com

Miami RC Raceway, Miami, Florida 33176; Mickey Cerra, (305) 630-3714; email: miamircraceway@aol.com

Monza R/C Speedway, Miami, Florida; Ed Delgado, (305) 437-9895

Morris Kohl's Raceway and Hobby Shop, Tampa, Florida 33604; Morris Kohl, (813) 931-1626

My Rose Hobbies & Crafts, Jupiter, Florida 33458; Mark Watson, (561) 744-3800

NORRA, Naples, Florida 34104; Rob Dondorfer, 239-417-1099; web: www.norra.mainpage.net

Pro Hobbies Speedway, Apopka, Florida 32712; Jim, (407) 886-4615; email: probobby@juno.com

Sarasota RC Speedway, University Park, Florida 34201; Jim Wilson, (941) 358-7047

South Palm Beach Racers, Boca Raton, Florida 33486; Mike Fazio, 561-338-5367; email: epine01@bellsouth.net; web: http://communitylink.gopbi.com/group/sprblrc

Superior Hobbie R/C Parking Lot Racing, Casselberry, Florida 32707, (407) 834-9299; email: racing@superiorhobbies.com; web: www.superiorhobbies.com

SWF RC Car Club, Fort Myers, Florida 33907; Mike Nardone, 941-278-1295; email: swfrcclub@yahoo.com; web: swfrcclub.tripod.com/swfrcclub

Tallahassee R/C Speedway, Tallahassee, Florida 32301; Tim Cook, 850-514-3365; email: idothtre@hotmail.com; web: www.geocities.com/rcdude1/rccars.htm

Tampa R/C Raceway, Seffner, Florida 33584; Carole Ramondini, 813-655-6366; email: carolehobbytown@aol.com

Treasure Coast R/C Club, Palm City, Florida 34990; Doug Goethe, 772-283-2260; email: 1ringo@gate.net

West Coast R/C Club, Lutz, Florida 33549; J.R. Sanyet, President, 813-991-0168

GEORGIA

Augusta R/C Racer's Club, Augusta, Georgia 30909; Darren, 706-860-5608; web: Augusta.rc.freehomepage.com

KEY TO SYMBOLS

- | | | | |
|--|-----------|--|--------------------|
| | Indoor | | Concrete |
| | Outdoor | | Asphalt |
| | Off-road | | Minis & Micros |
| | On-road | | On-site hobby shop |
| | Oval | | AC power |
| | Dirt oval | | Auto lap counting |
| | Carpet | | Food available |

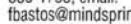
Dalton Motorsports, Dalton, Georgia 30721; Keith Manton, 706-226-6699; email: dmsd@dalton.net



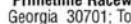
Echeconnee Superspeedway, Macon, Georgia 31216; Clifford Kline, 478-256-2032; email: gtocok1000@aol.com



Hobby Town Raceway, Columbus, Georgia 31909; Frank Bastos, (706) 660-1793; email: fbastos@mindspring.com; web: www.hobbytown.com



Primetime Raceway, Calhoun, Georgia 30701; Tommy Jackson, 706-625-9037; email: primetimehobby@gccinternet.net; web: primetimehobby@gccinternet.net



SCORE-Phil Hurd Raceway, Savannah, Georgia 31406; Pat Rossiter, Club President, 912-920-2668; email: rossspeed@msn.com; web: www.score-racing.org

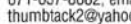


The Flight Box Hobby Shop, Rome, Georgia 30161-6826; Leslie Duke, (706)-234-3014



GUAM

Guaian Off-Road Racers Mangilao, Dedado, Guam 96929; Mr. Yoshimura, 671-637-8682; email: thumbtrack2@yahoo.com; web: guahannracers.net/firms.com/



HAWAII

A.S.I. Racing, Kapaa, Kauai, Hawaii 96746; Arnold Morales, 808-821-8132



Radio Control Assoc./Alaa Park Raceway, Pearl City, Hawaii 96782; Ace R/C Products, (808) 456-1279

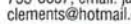


Sandy Flemings, Pearl City, Hawaii 96782; Dave Caldwell, 808-456-7272; email: info@formula1-rc.com; web: www.formula1-rc.com

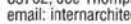


IDAHO

Almosta Ranch R.C.s, Twin Falls, Idaho 83301; Casey Clements, (208) 733-8667; email: james_casey_clements@hotmail.com



Capital Dirtsburners, Boise, Idaho 83702; Joe Thompson, 208-466-6334; email: internarchitect@yahoo.com; web: communities.msn.com/capitaldirtsburners



DM Raceway, Pocatello, Idaho 83201; Mike Buffalo, 208-233-8163; email: mike@dmraceway.com; web: www.dmraceway.com



ILLINOIS

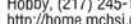
AJs Raceway & Hobby, Dekalb, Illinois 60115; AJ, 815-756-2772; web: www.ajsraceway.com



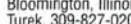
C&R Hobbies, Milford, Illinois 60953; Ray Craighead, 815-889-4073; email: thomas@milnet.net



C.I.R.C.A., Jacksonville, Illinois 62650; Randy Tendick - Sport-N-Hobby, (217) 245-1375; web: http://home.mchsi.com/~circa



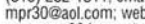
His N Hers Hobbies Raceway, Bloomington, Illinois 61701; Kevin Turek, 309-827-0204; email: hisnher-shobbies@aol.com; web: www.hisnherhobbies.com



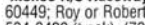
HobbyTown USA, Oak Park, Illinois 60301; Mark or Fred, (708) 445-8056; email: htuoip@aol.com



Machesney Park Raceway, Machesney Park, Illinois 61115; Gina, (815) 282-1311; email: mpr30@aol.com; web: www.mpr30.homestead.com



Monroe R/C Raceway, Monroe, Illinois 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597 (office)



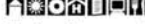
Primetime Hobbies, Tremont, Illinois 61568; Don Davis, 309-925-9999; email: staff@primetimehobbies.com; web: www.primetimehobbies.com



Radio-Active Raceway, Bolingbrook, Illinois 60440; Jim, (630) 759-7557; email: RCVoltar@aol.com

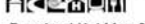


Venture Raceways, Libertyville, Illinois 60048, (847) 549-6963



INDIANA

Bremen Racing Ent., Bremen, Indiana 46506; Dale Heuberger, 219-546-3807



Duneland Hobbies & Raceway, Portage, Indiana 46368; Ron, 219-763-1610; email: RTrobaugh1@email.msn.com; web: www.dunelandhobbies.com



Hobby Barn Raceway, Terre Haute, Indiana 47802-9694, (812) 299-5773



P&T Hobbies and Raceway, Mitchell, Indiana 47446; Paul Weber or Tom Logsdon, (812) 849-6666; email: pthobby@quest.net; web: www.pthobby.com



Pete Russell's R/C Speedway, Elkhart, Indiana 46516; Pete Russell, 574-293-1827



R/C World of Indiana, Lynn, Indiana 47355; Joe Kolp, (765) 874-2464; email: rcworld@rcworld.com; web: www.rcworld.com



RC Barn, Monroe, Indiana 46772; Mark Lengerich, (219) 692-6600; email: bigdaddy@adamswells.com; web: www.rcbarn.com



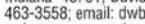
RCRCR Raceway, Boonville, Indiana 47601; Scott Payton, 812-477-9661; email: spdracer@speedex.net; web: www.rcrcr.com



Schoolyard RC Speedway, Lagrange, Indiana 46761; David W. Bryan, 260-463-3558; email: dwbryan@loc.net; web: www.rcspeedway.net



Showtime Lot Racing, Fort Wayne, Indiana 46819; Mike Romines, (219) 478-6099; web: fortwaynecrpark.tripod.com/



IOWA

Ames Radio Control Speed Assoc., Ames, Iowa 50014; Ryan Davis/Brad Scandrett, 515-231-3813/515-432-0467; email: Davismotors@aol.com



Dubuque R/C Speedway, Dubuque, Iowa 52002; Craig Schmal, 563-587-0218; email: rccraig7@aol.com; web: www.geocities.com/dbqrc



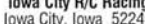
Hobby Haven, Des Moines, Iowa 50322; Rick Marble, (515) 276-8785; web: www.hobbyhaven.com



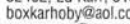
Independence, Independence, Iowa 50644; Eugene Bachman, 319-266-3857; email: BachmanE2@hotmail.com



Iowa City R/C Racing Association, Iowa City, Iowa 52240; Hobby Corner, (319) 338-1788



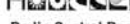
IROAR-Vinton Raceway @ Vinton Roller Rink, Cedar Rapids, Iowa 52402; Ed Karr, 319-362-1291; email: boxkarhobby@aol.com



Manly R/C Club, Manly, Iowa 50456; Bruce Hill, (641) 454-2025



Marble's Raceway, Des Moines, Iowa 50317; Rick Marble, (515) 262-7507



Radio Control Raceway Park, Fort Dodge, Iowa 50501-6746; Bernie Halverson, (515) 576-3780; email: bhalverson@dodgenet.com



RiverFront Speedway, Fort Dodge, Iowa 50501; Bernie Halverson, 515-576-3780 (515-571-1717 Race Day); email: bhalverson@dodgenet.com



Wild Bill's Raceway, Knoxville, Iowa 50138; William Anderson, Jr., 641-842-5973; email: wildbilz@iowatele.com.net; web: www.wildbillsracing.com



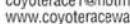
KANSAS

D&B Raceway, Menlo, Kansas; Ron Ball, (785) 855-2370

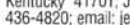


KENTUCKY

Coyote Raceway, Lexington, Kentucky 40505; Steve M., 859-253-9330; email: coyoterace1@hotmail.com; web: www.coyoteraceway.com



Dixon's R/C RaceWay, Hazard, Kentucky 41701; Jeff Dixon, (606) 436-4820; email: jeffdr1@hotmail.com



Mayking R/C Speedway, Mayking, Kentucky 41837; Jon Fields, 606-633-4700; email: jon1@se-tel.com



Pit Stop Hobbies, Paducah, Kentucky 42003; Robert or Rodney, 270-443-0052; email: pitstop1@apex.net



R.C. WOW, Falmouth, Kentucky 41040; John P. Jones, (859) 654-1700; email: rcwow@fuse.net; web: www.rcwow.com



Trio Hobbies & R/C, Radcliff, Kentucky 40160; Maurice Johnson, (502) 351-7547

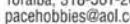


Wildcat Speedway, Nicholasville, Kentucky; David Bowles, 859-272-0231

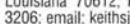


LOUISIANA

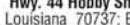
Fast Pace Hobbies, Alexandria, Louisiana 71301; Joseph or Casey Toralba, 318-561-2070; email: fastpacehobbies@aol.com



Gator R/C Raceway, Moss Bluff, Louisiana 70612; Tony Diaz, 337-855-3206; email: keithsjac@aol.com; web: homepage.mac.com/kmaples/



Hwy. 44 Hobby Shop, Gonzales, Louisiana 70737; Eric Olmstead, (225) 644-1773; email: eric209@aol.com



Red Stick R/C Raceway, Baton Rouge, Louisiana 70814; Michael Pino, 225-218-1002; email: redstick-raceway@aol.com; web: www.redstick-raceway.com



St. Charles RC Speedway, Destrehan, Louisiana 70047; Al Cazalot, (504) 764-0625; email: stcharlesracer@home.com; web: members.home.net/stcharlesracer

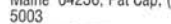


MAINE

Central Maine R/C Speedway & Hobbies, Fairfield, Maine 04963; David Prescott, (207) 453-4588; email: rrcracer@mint.net



Clay Bowl R/C Hobbies, Greene, Maine 04236; Pat Cap, (207) 946-5003



MARYLAND

Coles Race Way, Waldorf, Maryland 20602; Cole Brincefield, (301)-843-1386; email: kbrincefield@cs.com



GPA Hobbies, Crofton, Maryland 21114, 301-858-0004



HobbyTown USA, Glen Burnie, Maryland 21061; David Parkison, 410-590-4950; email: racing@mdhobbytown.com; web: mdhobbytown.com



The Track, Gaithersburg, Maryland 20877; Mimi Wong, (301) 417-9630; email: mimitrtrack@yahoo.com; web: www.rctrack.com



MASSACHUSETTS

Big Boys Toys, Fall River, Massachusetts 02723; Track Owner, 508-677-9400



East Templeton Model Raceway, Templeton, Massachusetts 01468; Keith Anderson, 1-978-632-1619; email: keith@glowplug.com; web: glowplug.com



Hi-Tech Hobbies, Raynham, Massachusetts; Ruben, (508) 880-5373



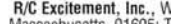
Megadrome Raceway, North Adams, Massachusetts 01247; Bob Blanchette, 413-743-7223



Northboro Speedway, Northboro, Massachusetts 01532; Bob Trimble, 508-393-8087 or 393-2691



R/C Excitement, Inc., Worcester, Massachusetts 01605; Todd Anderson, 508-753-8676; email: rcexcitement@aol.com; web: www.rcexcitement.com



RPM RC Raceway, Abington, Massachusetts 02351-1094; Richard Tonnelli, (781) 857-2300; email: hobtown@AOL.com; web: www.rpmhobbys.com



MICHIGAN

D.R. R.C., Taylor, Michigan 48180; Bobby or Fred, (734) 287-7405; web: www.downriverracing.8k.com



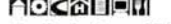
Dirt Burner Racing, Commerce, Michigan 48390; Bill, 248-926-1140; web: www.dirtburnerracing.com



E.U.P., Kincheloe, Michigan 49788; Joel Wiggins, 906-495-3503



Fastraxx, Brownstown, Michigan 48173; Greg Yingling, (734) 379-8980; email: fast33@hotmail.com



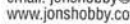
Great Lakes Racers Club, Grand Rapids, Michigan 49585; John Warner, 616-838-2231; email: Gr8LksRacers@aol.com; web: www.rogers.3.com/glrcl/



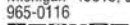
Hideaway Raceway, Napoleon, Michigan 49201; David Carlisle, 1-517-536-8821; email: adcarlisle1@netscape.net



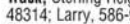
Jons Hobby, Mt. Pleasant, Michigan 48858; Jon Beutler, (517) 773-5412; email: jonshobby@earthlink.net; web: www.jonshobby.com



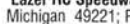
JT Superspeedway, Battle Creek, Michigan 49015; Jerry or Sam, 616-965-0116



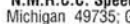
Larry's Performance RC Carpet Track, Sterling Heights, Michigan 48314; Larry, 586-997-4840; email: lprcs@qwest.net



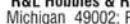
Lazer RC Speedway, Adrian, Michigan 49221; Russ Johnson, (517) 263-2806



N.M.R.C.C. Speedway, Gaylord, Michigan 49735; Gabe, (989) 732-3963; email: hobby-toy@voyager.net



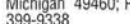
R&L Hobbies & Racing, Portage, Michigan 49002; Rex Simpson, (616) 323-3686; web: www.rhobbies.com



R.A.C.E. Inc., Jackson, Michigan 49203; Sam Sprang, (517) 787-9161



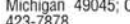
Raw Roots Race Tracks, West Olive, Michigan 49460; Roy Bennink, (616) 399-9338



Village Hobbies, Hesperia, Michigan 49421; John Fosdick, 231-854-1374; email: vtracing@triton.net



Village R/C Raceway, Decatur, Michigan 49045; Chuck Nolke, (616) 423-7878



MINNESOTA

Country R/C Raceway Park, Belview, Minnesota 56214-8115; Charles L. Steff, 507-641-8115



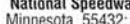
J's Radio Control Race Park, Starbuck, Minnesota 56381; Jay Campbell, (320) 239-4827



Kevin's Off-Road Raceway, Crookston, Minnesota 56716-2317; Kevin Altepeter, (218) 281-7523; email: kevin@krcproducts.com; web: www.krcproducts.com



National Speedway, Fridley, Minnesota 55433; Steve Hedenland, 763-571-9283; email: mrtip@national-hobby.com; web: www.nationalhobby.com



Northwoods Hobby Raceway, Brainerd, Minnesota 56401; John or Doug, (218) 829-9257



Twin Cities Hobby & Raceway, Brooklyn Park, Minnesota

Hobbies In Motion Raceway, Springfield, Missouri 65803; Matthew Froning, 417-886-9621; email: mfriding@hobbiesinmotion.com; web: www.hobbiesinmotion.com

North Missouri Raceway, Chillicothe, Missouri 64601; Billy Johnston, (660) 646-1120

Novelty R/C Raceway & Hobbies, Novelty, Missouri 63460; Rex & Jena Franke, 660-739-4530; email: rex_jena@noveltyrc.com; web: www.noveltyrc.com

Ozarks R/C Raceway, Springfield, Missouri 65803; Gene Rhodes, 417-873-9350(Track), 417-742-4376(Home); email: OzarksRaceway@aol.com

RCTRAX Racing Club of Central Missouri, Hallsville, Missouri 65255; Gary Phillippe, 573-442-8183; email: philipp74@verizon.net

Real Blue Vue R/C, Kansas City, Missouri 64133; Steve Hale, (816) 358-0238; email: hrealrc@aol.com; web: www.geocities.com/real_rc_raceway

Real R/C Raceway, Pleasant Hill, Missouri 64080; Steve Hale, (816) 540-5584; email: hrealrc@aol.com; web: www.real-rc.com

Showtime Speedway, Bakersfield, Missouri; Don Risner, (601) 203-1481

MONTANA

Garden City R/C Speedway, Missoula, Montana 59801; Brian Culp, (406) 549-7992; email: gardencityrc@msn.com

Magic City Racers, Billings, Montana 59102; Bryan Grummett, 406-656-8266; email: jsvases@tgsolution.net; web: www.magiccityrc.com

RC Offroad Association of Racing (ROAR), Libby, Montana 59923; Jamie, 406-293-6506; email: shark-boyet@hotmail.com

NEBRASKA

Hadar R/C Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922

Hobby Town Raceway, Lincoln, Nebraska 68505; Chris & Chad, 402-434-5056; email: eaststore@aol.com

Hobby Town USA Raceway Park, Lincoln, Nebraska 68508; Chad & Chris, 402-434-5056; email: eaststore@aol.com

NESCAR Raceway, Grand Island, Nebraska 68801; Steve Blayney, 308-382-0920; email: spinkgi@nebi.com

O.N.R.O.A.D., Omaha, Nebraska 68104; CoRK Jacobs, (402) 556-8674

OTWG Carpet Raceway, Norfolk, Nebraska 68701; John Schoenauer, (402) 644-7922

The Salvation Army Speedway, Omaha, Nebraska 68164, 402-734-3414

NEVADA

Dansey's Indoor R/C & Hobbies, Las Vegas, Nevada; David Lugo, (702) 453-8631; email: danseyd@netnet.net; web: www.danseys.com

Las Vegas R/C Raceway, Las Vegas, Nevada 89139; Patrick Quinn, 702-365-1396; email: patrickquinn98@lycm.com; web: www.lasvegascraceway.com

T-Rix bikes & R-C shop, Elko, Nevada 89801; Gary Perkins, (775) 777-8804; email: mtnman14k@hotmail.com

NEW HAMPSHIRE

Hill Top R/C, Troy, New Hampshire 03465; Pete Bastoni/Jim MacPherson, 603-242-3222; email: hilltoprc@netnet.net; web: www.hilltoprc.com

Lakes Region R/C Speedway, Gilford, New Hampshire 03246; Louie Blais, 603-524-2909; email: racing@lakesregionrc.com; web: www.lakesregionrc.com

RT 106 Racepark, Pembroke, New Hampshire 03275; David Daniels, 603-224-7223; email: david@collectrac.com; web: www.106racepark.com

NEW JERSEY

America's Hobby Center Inc., North Bergen, New Jersey 07047; John Many, (201) 662-0777; web: www.ahc1931.com

Back Track Raceway, Hammonton, New Jersey 08037; Bob W., 609-214-5016

Checkerboard Raceways, Elwood, New Jersey 08217; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net

Family Hobbies Raceway, Vineland, New Jersey 08360; Linda Vogel, 856-696-5790; email: familyhobbies@yahoo.com; web: familyhobbiesraceway.com

Jackson RC Club, Jackson, New Jersey 08527; Al Sardano, 732-364-6422; email: Tazzy@optonline.net; web: www.jacksonrcracing.com

Jefferson Speedway, Oak Ridge, New Jersey 07438; Jim, (973) 697-7525

Millville R/C Oval & Roadcourse, Millville, New Jersey 08332; William Denstoz, 856-327-4640

On Trax Hobbies, Browns Mills, New Jersey 08015; Joseph DiGirolamo, (609) 735-0422

PottBellys R/C Speedway, Pitts Grove, New Jersey 08360; Drew Anastasio, 856-207-2495; email: pottbelly@pottbellysrc.com; web: www.pottbellysrc.com

South Jersey Cost Controlled Racing, Sicklerville, New Jersey 08081; Ray Murray, 856-629-9413; email: RaysTrack@webtv.net; web: www.sjccr.com

SpeedPro Dragway, Elizabeth, New Jersey 07206; Albie Nizolek, 908-351-5080; email: funnycar176@aol.com; web: www.speedpro.org

The Race Place, Farmingdale, New Jersey 07731; John Fary, (908) 938-5215

Wacky RC Raceway, Roselle, New Jersey 07203; Tony Williams or Kimble Wright, (908) 241-6700

NEW MEXICO

Albuquerque R/C Off-Road Raceway, Albuquerque, New Mexico 87120; Bill Mitchell, (505) 250-3411(m); (505) 898-6181(h); email: info@rcdirttrack.com; web: www.rcdirttrack.com

Speed Zone, Clovis, New Mexico 88101; Brad Ferguson, 505-769-1737; email: speedzone@yucca.net

NEW YORK

BarnStormers R/C Raceways, Chester, New York 10918; Lou Sysma, 845-469-BARN(2726) or 469-6468; email: iamsysma@hotmail.com; web: www.barnstormersrc.com

Brennan's RC Hobbies, Vernon, New York; Bill or Tom Brennan, (315) 829-4930

Brooklyn Hobbies, Brooklyn, New York 11234; Chris Palermo, 718-951-2500; email: brooklynhobbies@aol.com; web: www.brooklynhobbies.com

Bruckner Racing, Bronx, New York 10465; Thomas Baffers Sr., (800)-288-8185

Capital District Radio Controlled Stock Car Club, Rensselaer, New York 12144; Eric Conrardt, 315-482-7128; email: cdrcsc@hotmail.com; web: www.cdrcracers.50megs.com

Chipmunk Hill R/C Speedway, Theresa, New York 13691; Ted or Pete House, (315) 628-5065

Competition Hobby Supplies & Speedway, Cohoes, New York 12047; Howie Cummings, 518-786-3622; email: howard.cummings@verizon.net; web: www.competitionhobbysupplies.com

East Coast R/C Hobbies, Brooklyn, New York 11204; John Giangrande, 718-627-3814

Fastraks, Hogsburg, New York 13655; Mark Castonguay, (518) 358-3686; email: troghobbb@northnet.org; web: www.fastraks.8m.com

Hobby Zone Raceway, Ozone Park, New York 11417; Brian, Sean or Adam, (718) 641-9001; email: moon-chaserwolf@aol.com

Lil Wheels Raceway, Oswego, New York 13126; Bill Meyer, 343-6566; email: lilwheelsraceway@hotmail.com; web: lilwheelsraceway.tx.org

Long Island Raceway, Farmingdale, New York 11735; James, (516) 845-7223; web: www.raceway.com

PRO Speedway, Cattaraugus, New York 14719; Marc Pritchard, (716) 257-3101

Radio Hill Raceway, Dundee, New York 14837; Bill or Greg, 607-243-8641 (Bill); 607-243-7899 (Greg)

Rampage R/C & Hobbies, Hyde Park, New York 12538; Brian Walker, (845) 229-1379

South Shore Hobby & Raceway, Coram, New York 11727; Benny or Bonnie, 631-696-8500; email: sshob@northeast.net; web: www.southshorehobby.com

Southern Tier Raceway, Owego, New York 13827; Anita Harding, (607) 687-5395

TARMAC Ultimate R/C Raceways, Poughkeepsie, New York 12603; Todd Plass, 845-342-5409 (Todd); 845-454-8276 (Track-Sundays); email: toddp@tarmacraceway.com; web: www.tarmacraceway.com

Walt's Hobby, Syracuse, New York 13209; Bruce, 315-453-2291; web: www.walts-hobby.com

Willis Hobbies R/C Speedway, Minerva, New York 11501; Ken Ford, 516-746-3944; web: www.willishobbies.com

NORTH CAROLINA

Antique Barn & Hobby Shop, Wilson, North Carolina 27893; Steve, (252) 237-6778; email: antiquebarn@esn.net

Chatham R/C Raceway, Bear Creek, North Carolina 27207; Dwight Fields, (919) 898-4518; email: chatham_rc_speedway@yahoo.com; web: www.chathamrcspeedway.com

R.C.R. Speedway, Salisbury, North Carolina 28147; Ronnie Linker, (704) 637-2565

Race City Motor Speedway, Mooresville, North Carolina 28115; Ray Kelly, 704-660-6601; email: Kellyrcms@cs.com; web: racecitymotorspeedway.com

Rosewood RC Speedway, Goldsboro, North Carolina 27530; Glenn Elam, 919-734-7754; email: elam49@hotmail.com; web: www.glennshobbycorner.com

Sandhills Raceway, Southern Pines, North Carolina; Mike Russel, 910-245-4450; email: mrmrc@mindspring.com; web: www.sandhillsraceway.com

Southern R/C Motorsports Club, Shallotte, North Carolina 28459; Chris Dixon, (910) 754-6315; email: nohope@atmc.net

Xtreme Hobbies, Kannapolis, North Carolina 28083; Chris Lyerly, 704/933/5321; email: thehobbyshop02@aol.com

NORTH DAKOTA

Grand Forks Remote Control Racers, Grand Forks, North Dakota 58201; Dan Miller, 701-746-9910; email: dandmiller@juno.com; web: mule.puah.org/gfrcr

OHIO

AK Hobby & Raceway, Cincinnati, Ohio 45211; Tim Tolle, (513) 661-7080; email: tim@akhobby.com; web: www.akhobby.com

American Ohio Sprint Car, Wickliffe, Ohio 44092; Gary Waldhelm, 440-944-9966; web: www.aosca.8m.com

Black Swamp RC Car Club, Toledo, Ohio 43623; Riders Hobbies, 419-843-2931; email: ridersrcclub@webtv.net; web: www.blackswampc.cjb.net

CORCAR/Sams Club, Galloway, Ohio 43119-8732; Bill Stevenson, (614) 870-7159

D&J R/C Raceway, Orrville, Ohio 44667; Don, (330) 682-4266

DeFosse Raceway, Ripley, Ohio; Greg DeFosse, (937) 377-2063

Hobbyland Raceway, Proctorville, Ohio 44669; Craig Harber, 740-886-0502 or 740-886-0662; email: pitrow-eracing@webtv.net; web: hobbyland-raceway.homestead.com

Mid Ohio Dirt Oval, Lexington, Ohio 44004; D&D Hobby Center, (419) 884-0001

Nothing But Air R/C Track, Logan, Ohio 43138; Gary Lloyd, 740-385-0288

Ohio Valley OffRoad R/C Raceway, Jerusalem, Ohio 43747; Kevin Wilson, (740) 926-1738; email: console@1st.net; web: www.ovor.8m.com

Outlaw Speedway, Lexington, Ohio; Eric Radio, 419-884-0001; email: kramerj@2aol.com; web: rcdirtoval.freeweb.com

R/C Hobby, Medina, Ohio 44256; Larry Lutz, 330-723-0255; email: kohouty@aol.com

Raceway 42, Mansfield, Ohio 44905; Chris Cates, 419-589-4173; email: mopar340v8@aol.com; web: www.raceway42.itgo.com

River Rat Racing, Ripley, Ohio 45167; Jon Faris, 937-392-9298; email: honey3@bright.net; web: www.riverratraceway (under construction)

T.S.R.C.A.R., Hamilton, Ohio 45011; Dennis Young, (513) 367-5634; email: scalercar@aol.com; web: www.tri-staterautoracers.com

TARCAR, Toledo, Ohio 43617; Bill Bridges, (419) 826-3859

Ultra Racing R/C Hobby and Track, Hamilton, Ohio 45015; Ed Lewis, 513-863-7342; email: UltraRacing@aol.com; web: www.rccaronline.com

Van Wert R/C Raceway, Van Wert, Ohio 45891; Mark Davis, (419) 232-1112

Y-City Hobby & Speedway, Zanesville, Ohio 43701; Kevin McKenna, (740) 455-3025; email: Kevin@y-city-hobby.com; web: www.ycityhobby.com

OKLAHOMA

Action Hobbies, Tulsa, Oklahoma 74145; David Cole, (918) 663-8998; email: acthobby@aol.com

KEY TO SYMBOLS

- | | | | |
|--|-----------|--|--------------------|
| | Indoor | | Concrete |
| | Outdoor | | Asphalt |
| | Off-road | | Minis & Micros |
| | On-road | | On-site hobby shop |
| | Oval | | AC power |
| | Dirt oval | | Auto lap counting |
| | Carpet | | Food available |

Action RC Speedway, Oklahoma City, Oklahoma 73135; Jerry Hawthorne, (405) 670-7770; email: ginnha@flash.net; web: www.actionrc.com



Adams Creek R/C Speedway, Broken Arrow, Oklahoma 74014; John Beighle, (918) 355-1416



Competition R/C, Oklahoma City, Oklahoma 73149; James or Louise Brown, (405) 634-0809; email: com-prc1@aol.com



Enid R/C Speedway, Enid, Oklahoma 73703; Darin Pendleton, (580) 554-9400; email: darin@enid.com; web: www.enidrcspeedway.com



HobbyTown USA, Norman, Oklahoma 73072; Todd Jensen, (405) 292-5850



Wings N Things Raceway, Tulsa, Oklahoma 74105; Heath Anderson, (918) 745-0007



OREGON

Competition Racing Association, Portland, Oregon 97230; Mark Taylor, Pres., 503-761-1334; 503-761-0433fax; email: mark@cra-news.com; web: cra-news.com



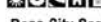
Dirt City RC, Albany, Oregon 97321; Doug Vertrees, (541) 791-1089; email: quicktemperrc@aol.com



R/C Plus Hobbies Raceway, Salem, Oregon 97302; Ron Smith, (503) 364-9188; email: rcplus@rcplus.com; web: www.rcplus.com



R/C Speed Center, Medford, Oregon 97501; Gene & Betty Jean Skelton, 541-779-8298



Rose City Scale Racing, Milwaukie, Oregon 97222; Rick Strauss, (503) 631-2929; web: www.rc-cars.com



PENNSYLVANIA

Bumps & Jumps RC Speedway, Middletown, Pennsylvania 17057; Chris McKinney, 717-284-4613; email: chrismc@bigfoot.com; web: www.bumpsandjumps.com



Courtview Raceway, Washington, Pennsylvania 15301; Aaron Stimmell Jr., 724-228-8396



DC Ultra Trax, Warminster, Pennsylvania 18974; David Cowan, (215) 672-5200; web: www.jcrchobbies.com



Dreamboat Hobbies, Warren, Pennsylvania 16365; Louie Dussia, (814) 723-8052; email: dreamboat77@yahoo.com



J&K Hobbies and Raceway, Jersey Shore, Pennsylvania 17740; Jason Corter or Kevin Casbeer, 570-398-8171; email: rcmaniac01@msn.com



Kranzel's R/C Raceway & Hobbies, Lemoyne, Pennsylvania 17043; David or Stuart Kranzel, (717) 737-7223; web: www.kranzelsrchoobbies.com



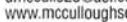
Little Plum R/C Hobbies, Lock Haven, Pennsylvania 17445; Larry Duck, (570) 769-1984



Marshall's R/C Raceway, Honesdale, Pennsylvania 18431; Bill or Dot Marshall, (570) 729-7458



McCullough's Offroad, Sarver, Pennsylvania 16055; Doug McCullough, (724) 352-0116; email: dmcull323@aol.com; web: www.mcculloughsoffroad.com



Newville RC Speedway & Hobbies, Newville, Pennsylvania 17241; Randy or Mike, 717-776-5568; email: newvillerspeedway@yahoo.com; web: www.newvillerspeedway.com



Pit Stop Hobbies, Mount Joy, Pennsylvania 17552, (717) 653-6222; email: pitstophobbies@pitstophobbies.net; web: www.pitstophobbies.net



Racers Edge R/C Racing & Hobbies, Smethport, Pennsylvania 16749; Rick Morgan or Johna Simar, (814) 887-9256; email: racersedgerc@mind-spring.com; web: www.racersedgerc.com



RB Motorsports & Hobby, Northumberland, Pennsylvania 17857; Rick Bunting, (570) 473-8711



RC Avenue II, Bradenville, Pennsylvania 15650; Chris Demyan, 724-537-9592; email: 12ss@msn.com



RC Dirtburners Club, Windber, Pennsylvania 15963; Bruce Schmidt, (814) 266-4118; email: rckidd1@cs.com



RC Outfitters, Hanover, Pennsylvania 17331; Chris Shaffer, (717) 633-9490; email: thestore@rcchoobbies.com; web: www.rcchoobbies.com



Riverside Raceway, Warren, Pennsylvania 16365; Jeff, (814) 723-4211



Staub Bros. R/C Speedway, Gettysburg, Pennsylvania 17325; Todd or Scott Staub, 717-334-8488; web: www.staubbrothers.com



The Raceway at River Junction, Beaver, Pennsylvania 15009; Sam or John, (724) 728-5571; email: riverjct@stargate.net



Thunder Road Raceway, Limerick, Pennsylvania 19468; Barry or John, 610.831.8898; email: xslogtdx@aol.com; web: www.tow-barrc.com



Track 84, Narran, Pennsylvania 17555; Andrew Flexer, (717) 354-6503



Trains & Lanes Raceway, Easton, Pennsylvania 18045; Jeff Setzer, (610) 253-8850 or (800) 447-4891; email: trainslanes@aol.com



TRP, Kingston, Pennsylvania 18704; Rob Yeager, 570-283-3066; email: rrobb99@aol.com

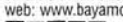


WillCam Raceway, Punxsutawney, Pennsylvania 15767; James Campbell, (814) 939-4251



PUERTO RICO

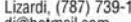
Bayamon R/C Park, Bayamon, Puerto Rico 00956; Damian Cruz & Javier Rivera, (787) 869-8092 & 401-2770; email: damian@bayamonrcpark.com; web: www.bayamonrcpark.com



Hi-Speed C Raceways, San Juan, Puerto Rico 00926; Carlos Ortiz, (787) 283-0198; email: hispeed@hotmail.com; web: www.hispeedhobby.com



Mech Tech Touring Park, Caguas, Puerto Rico 00725; Humbert (Tito) Lizardi, (787) 739-1572; email: tlizardi@hotmail.com



Tropical Raceway Track, Manati, Puerto Rico 00674; Hector Pabon/George Pabon, 787-785-9529; email: trophob@coqui.net; web: www.tropicalhobby.com



RHODE ISLAND

Insane Track, Cranston, Rhode Island 02907; Jose Jimenez, 401-467-8878; email: chevygo8@aol.com; web: www.insanehobbies.homestead.com



SK Hobbies Inc., Johnston, Rhode Island 02919; Slim or Keith, (401) 453-1440



SOUTH CAROLINA

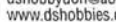
Atomic Racers, Aiken, South Carolina 29803; Bill Jackson, 706-855-0846 or 803-725-1664



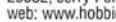
Carolina R/C Speedway, Easley, South Carolina 29640; David, 864-295-1209; email: cprahlrc@mind-spring.com; web: www.carolinarc.com



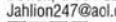
D&S Hobbies R/C Track, Hartsville, South Carolina 29550; Don Dietz, 843-383-0017; email: dshobbydon@aol.com; web: www.dshobbies.com



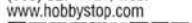
Darlington R/C Raceway at Hobbies & More, Darlington, South Carolina 29532; Jerry Pollard, (843) 393-0355; web: www.hobbiesmore.com



Hi Voltage Raceway, Anderson, South Carolina 29625; Whitner Bowen, 1-864-225-8680; email: Jahlon247@aol.com

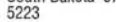


The Grove Racing Center, Rockhill, South Carolina 29730; Don Faris, (803) 327-4121; web: www.hobbystop.com



SOUTH DAKOTA

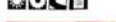
Dakota Off-Road Racers, Aberdeen, South Dakota 57401; Kevin, 605-225-5223



Grassland Racers, Black Hawk, South Dakota 57718; Ryan Logan, (605) 787-5632



Triple B, Winner, South Dakota 57580; Broc Stout, (605) 842-2699

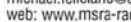


TENNESSEE

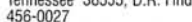
Hobby Town USA, Franklin, Tennessee 37067; Bobby Mills, (615) 771-7441; email: htu126@aol.com



Mid-South Racing Association, Memphis, Tennessee 38133; Michael Feliciano, 901-268-7969; email: michael.feliciano@expeditors.com; web: www.msra-racing.com



MSA R/C Racing, Crossville, Tennessee 38555; D.R. Findley, (931) 456-0027



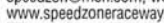
Need For Speed Raceway R/C, Chattanooga, Tennessee 37415; Ronnie Cox, (423) 876-9019



Robertson's R/C Raceway, Jackson, Tennessee 38301; Travis Robertson, 731-423-6984; email: RobertsonRC@aol.com



SpeedZone Raceway & R/C Hobbies, Sweetwater, Tennessee 37874; Mike Henderson, 423-351-0055; email: speedzon@msn.com; web: www.speedzonraceway.com



Stateline Village Raceway, Ducktown, Tennessee 37326; Len James, 423-496-5006; email: statelin@ellijay.com



W.O.W. Raceway, Beech Bluff, Tennessee 38313; Brad Jones, 731-427-1625; email: wowracer@hotmail.com; web: go.to/wowracing

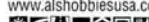


TEXAS

215 Speedway, Abilene, Texas 79602; Clyde Gardner, (915) 673-2351



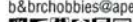
Al's Hobbies, San Antonio, Texas 78227; Alfonso Robles, 210-645-1050; email: alshobbies@usa.com; web: www.alshobbiesusa.com



Austex RC, Austin, Texas 78757; Michael, 512-458-2324; web: www.austexrc.com



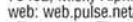
B&B R/C Hobbies, Big Spring, Texas 79720; Walter Bumbulis, (915) 263-1790; email: b&brchobbies@apex2000.net



Big Mike's R/C Raceway, Longview, Texas 75604; Mike Sumrow, 903-297-7814



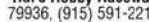
Drycreek Raceway, Greenville, Texas 75402; Micky Alphin, 903-527-5381; web: www.pulse.net/drycreek



Finishline Raceway, Hurst, Texas 76053; Damon Darnall, (972) 404-0463; email: Finishline@ev1.net; web: http://users.ev1.net/~finishline/index.htm



Hal's Hobby Raceway, El Paso, Texas 79936, (915) 591-2213; web: www.halshobbywarehouse.com



Hobby Center Race Track, Houston, Texas 77598; Issac Ben-Ezra, 281-488-8697; email: hobbycenter@issac-smodels.com; web: www.hobbycenter.cc



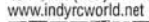
Hobbytown USA, San Antonio, Texas 78209; Clark, (210) 829-8697; fax (210) 829-8707



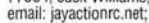
Indy R/C World, Garland, Texas 75041; Steve Webster, (972) 271-4844; fax (972) 271-4502; web: www.indyrcworld.net



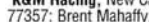
Js Action R/C, Pasadena, Texas 77504; Jack Williams, 713-946-8888; email: jayactionrc.net; web: www.jsactionrc.com



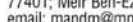
K&M Racing, New Caney, Texas 77357; Brent Mahaffy, (281) 399-9777



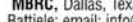
M&M Hobby Center, Bellaire, Texas 77401; Meir Ben-Ezra, 713-661-7137; email: mandm@mhmhobby.com; web: www.mhmhobby.com



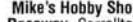
MBRC, Dallas, Texas 75093; Mike Battelle; email: info@mbrc-racing.com; web: www.mbrc-racing.com



Mike's Hobby Shop Superstore & Raceway, Carrollton, Texas 75006, 972-242-4930; web: www.mikeshobbyshop.com



Reflex R/C, Houston, Texas 77055; Joseph Chen, (713) 464-4458; web: www.reflexrc.com



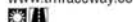
T&M Raceway R/C Drag Racing, Addison, Texas 75244; Marvin Jackson, (972) 416-0445; email: mjakson@tmraceway.com; web: www.tmraceway.com



T&T R/C Cars, Plano, Texas 75024; Joe Sullivan, (972) 633-2470



The Rollcage, Greenville, Texas 75402; Guy Allen, (903) 883-0332; email: rollcage2000@therollcage.com; web: www.therollcage.com



Thompsons RC Raceway, Lufkin, Texas 75901; Mark Thompson, (936) 637-0093



W.E.S. Hobby Race, Beaumont, Texas 77701; Marty Walker, (409) 839-4929



X-Treme Hobbies, Round Rock, Texas 78664; Jeff Santos, (512) 310-0444 or (512) 388-3819



UTAH

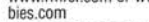
Hobbie Stop Raceway, Riverdale, Utah; Todd Hamilton or Beazer Martin, (801) 622-0841



Intermountain R/C Raceway, Magna, Utah 84044; David Mott, 801-250-8303; email: rcmother1@aol.com; web: members.aol.com/rcmother1



Outback Raceway, Ogden, Utah 84404; Steve Brown or Beazer Martin, 801-726-3458; email: Steve@rmrcr.com or Beazer@bibbs.com; web: www.rmrcr.com or www.beazershobbies.com



Vision Hobby, Orem, Utah 84057; Ken Rice, (801) 226-6226

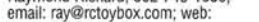


VERMONT

Empire Hobbies Off-Road Raceway, Saint Albans, Vermont 05478; Scott or Jen, 877-446-2243; email: empirehobbies@surfglobal.net; web: www.empire-hobbies.com



R/C Toy Box Hobbies & Tracks LLC, Saint Johnsbury, Vermont 05819; Raymond Richard, 802-748-1030; email: ray@rctoybox.com; web: www.rctoybox.com

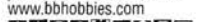


VIRGINIA

Brad's Hobbies, Staunton, Virginia 22401; Brad, (540) 885-3642; email: brad@bradshobbies.com; web: www.bradshobbies.com



Brown Brothers Hobbies, Dumfries, Virginia 22026; Joe or Bob Brown, 703-221-5746; email: joe@bbhobbies.com; web: www.bbhobbies.com



DRCW Raceway, Virginia Beach, Virginia 23454; Les Modlin, 757-340-6681; web: www.debbiesrcworld.com



Hampton Roads R/C Drag Club, Virginia Beach, Virginia 23452; Garry Nelson, 757-399-9645; email: Garry@psdragracing.com; web: www.HRRDC.com



KC's Radio Control & Repair, Lynchburg, Virginia

Stream Hobby Shop, Newport News, Virginia 23605; Rusty Kennedy, 757-591-0720; email: streamrc@aol.com; web: streamhobbyshop.com



The Tiltyard, Dayton, Virginia 22821; Homer, 540-828-3476; email: homer@tiltyard.com; web: www.tilt-yard.com



Thunder Road RC Speedway, Gordonsville, Virginia 22947; Robert Bingle, 434-296-6549; email: tripod@thunderroadrc.com; web: www.thunderroadrc.com

Tidewater R/C Speedway, Inc., Hampton, Virginia 23663; Jim Pike, Rob Marsette, Dave Pritchard, (757) 723-8927; email: zeeey31@hotmail.com



WASHINGTON

A-Main Raceway, Vancouver, Washington 98685; Monty Coleman, (360) 571-8404; web: www.amainraceway.com



Burien Toyota R/C, Seattle, Washington 98148; Ray Meek, (800) 654-6456



Cedardale Raceway, Mount Vernon, Washington 98273; Craig, 360-755-9464



Fantasy World Raceway, Tacoma, Washington 98408; Dave Kleinman, (253) 473-6223; email: sales@fantasy-worldhobbies.com; web: www.fantasy-worldhobbies.com



Four Season R/C Racing, Olympia, Washington 98506; Gary and Sharon Brown, (360) 491-2430



Hank Perry Raceway, Spokane, Washington 99023; Hal Hudson, 509-879-3503; email: halshudson@msn.com



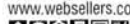
HobbyTown USA, Tacoma, Washington 98408; HobbyTown USA Shop, (253) 474-7787



HobbyTown USA, Lynnwood, Washington 98037; Rich or Jamie, 425-774-0819; email: rhobbytown@aol.com



Paradise Raceway and Hobbies, Spokane, Washington 99207; Mark, 509-483-1843; email: paradiserc@hotmail.com; web: www.websellers.com/paradise



Race City, Auburn, Washington 98002; Bruce, (253) 939-2515; email: auburn@pacifier.com



Rain City RC Raceway, Lynnwood, Washington 98036; Pete or Debbie Cartwright, 425-776-8241; email: info@raincityraceway.com; web: www.raincityraceway.com



Redmond Hobbies Raceway, Redmond, Washington 98052; Stan Ng, (425) 885-3639; email: info@redmondhobbies.com; web: redmondhobbies.com



Schmidt's Auto Parts, Marysville, Washington 98271; Jon Failla, (360) 653-8838; web: www.schmidtsracerway.com



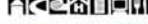
Spokane Indoor Raceway, Spokane, Washington 99212; Brian Batch, 509-487-2122



Tacoma R/C Raceway, Tacoma, Washington 98406; Scott Brown, (253) 565-1935; web: www.tacomarc-raceway.com



West Coast Hobby & Raceway, Richland, Washington 99352; Darren Shank, (509) 375-4995



WEST VIRGINIA

Burr Fab R.C. Raceway, West Union, West Virginia 26456; Mark Travis, 304-873-2487; email: burrshouse1@cs.com



Fulton's R/C Raceway, Wheeling, West Virginia 26003; James Fulton, (304) 233-5355



Mountwood Raceway, Vienna, West Virginia 26105; Tom Allen, 304-295-3234; email: ray@ovrccc.com; web: www.ovrccc.com

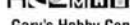


Quiet Dell Raceway, Fairmont, West Virginia 26554; Darris, (304) 366-1441; email: Tateracing@aol.com



WISCONSIN

ABC R/C Inc & Raceway, Waukesha, Wisconsin 53186; Dick Mathieson, 262-542-1245; email: Help@abcrchobby.com; web: www.abcrchobby.com



Gary's Hobby Center, Racine, Wisconsin 53403; Bill Phalen, 262-554-8884



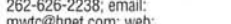
KDM Raceway, Abbotsford, Wisconsin 54405; Kevin Michlig, 715-223-4414; email: kdmhobby@charter.net; web: kdmhobby.homestead.com/kdmhobby.html



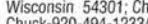
MARCCA Raceways, Poynette, Wisconsin 53955; Don Hartley, 608-243-1778; email: hotrodhartley@aol.com; web: www.marcca.com



Mid-West Tri-Clone/Tri-Clone Offroad, West Bend, Wisconsin 53095; Dave Hilpert, 262-334-0429 or 262-626-2238; email: mwtc@hnet.com; web: www.triclone.com



Pro-Star Racing, Green Bay, Wisconsin 54301; Chuck or Randy, 920-494-1233/Randy-920-336-5503; web: www.prostarracing.com



S&N's Trackside Hobbies and Raceway, Milwaukee, Wisconsin 53005; Scott Ernst, 262-783-4699; email: sernst@trackside.com; web: www.trackside.com



The Shorthalf Raceway, Eau Claire, Wisconsin 54701; Scott Schoettie, 715-838-8350; email: Scottschoettie@mcleodusa.net



WYOMING

Xtreme Hobbies Raceway, Gillette, Wyoming 82718; Krieg Balls, 307-682-6077; email: xtreme@vcn.com



ARGENTINA

Circito R/C Lobos, Lobos, Buenos Aires 7240; Rupert Bruce, 54-02227-422905; email: rclobos@yahoo.com; web: www.rclobos.8m.com



Circuit M.R. Models, Buenos Aires 1428; Maximiliano Roballos, 54 11 4557 1000, fax 4780 1607; email: info@kyosho-argentina.com.ar; web: www.kyosho-argentina.com.ar



Club A. Velez Sarsfield, Buenos Aires; Jorge Herrero, 54-01-658-5851



AUSTRALIA

A.C.T. Model Car Racing Club, Wanniania, ACT; Gary Davey, 61-6-2871411



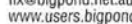
A.C.T. Remote Control Car Club, Kambah, ACT; Rob Jorgensen, 61-2-6231-9925; email: bjorgo@isr.gov.au; web: users.bigpond.net.au/gr/actccc.html



Aubry R/C Car Club, Aubry, New South Wales 2640; Ron Langman, 060-247-128



Brisbane Dirt Racing, Brisbane, Queensland 4053; Jeff Chandler, 07 3355 7476, 041 878 3201; email: bigfix@bigpond.net.au; web: www.users.bigpond.net.au/bigfix



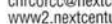
Canberra Off-Road Model Car Club, Narrabundah, ACT 2604; Graham Brown, 61-6-241-3070



Carline R/C Model Car Club, Inc., Greenwood, Western Australia; Mitchell Davies, 0418 955 981; email: t3davis@inet.net.au



Castle Hill Radio Control Off Road Car Club, Castle Hill, New South Wales 2754; Peter Ellis, 0412 257 353; email: chrcc@nextcentury.com.au; web: www.nextcentury.com.au/chrcc



Central Coast ORRCC, Bateau Bay, New South Wales 2261; Peter J. Knight, 61-43-693-698



Illawarra RCECC, Albion Park Rail, New South Wales 2527; Mel or Andrew, 042-714-683



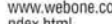
Lakeside R/C Racing Car Club, Lansvale, New South Wales 2166; R. Bartolozzi, 62-2-907-9800



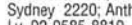
Melton Electric Circuit Car Association, Melton, VIC 3337; Arthur Joslin, 61-3-9747-8805



Monaro Radio Control Car Club, Queanbeyan, New South Wales 2902; Graham Brown, 02 6241 3070; email: gbrown@webone.com.au; web: www.webone.com.au/~gbrown/mrccc/index.html



NSW Indoor R/C Raceway, Hurstville, Sydney 2220; Anthony Lee or Walter Ly, 02-9585-8810



Penfield Park, Adelaide, South Australia 5108; Trevor UNew South Walesorth, (618) 8289-5010



R.C. Speedway, Newcastle, New South Wales 2300; Andrew Dillon-Smith, 02-49265966



TFTF - Templestowe Flat Track Racers, Templestowe, Victoria 3106; Nigel George, see website; email: tftf@imagefile.net; web: drive.to/tftf



The Bayside Raceway, Brisbane, Queensland 4178; Nigel Bell, 07 3893 1864; email: mwr1@dingobluenet.au



Victorian Radio Control Drag Racing Association, Melbourne, VIC 3940; John de Tracy, 03 59820459; email: bjrm1@hotmail.com; web: www.ozemail.com.au/~john59/index.html



Wee Waa's Offroad RC, Burren Junction, New South Wales 2386; Shane, 61-02-6796-1339



Wedonga R/C Car Club, Wedonga, VIC 3690; Paul Townsend, 02-6056-0706; email: townsend175@ozemail.com.au



AUSTRIA

RMC-Wien, Vienna A-1220; Herbert Holze/Martin Hrzak, +43-664-4730376



BARBADOS, WEST INDIES

R.O.A.R. (Radio Operated Auto Racing), St. Michael; Marva Clarke, (246) 427-3907

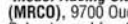


BELGIUM

ATR-Alka-Tele-Racing, Limburg; Alken, 0032-11-25-49-03



MBV-Kampenhout, Kampenhout B1910; Frank Mostrey, 0-16-65-75-18



Model Racing Club Oudenaarde (MRCO), 9700 Oudenaarde; Nicky Delmote, and fax: 32 35 30 36 25; email: mrco_racing@hotmail.com; web: mrco-racing.tripod.com



MRCZ, De Burg; Montie, 75-71-63



R.C.R., Rette 2470; A. Eelen, 32-14-379655

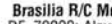


BRAZIL

AGARC Associação Goiana de Automodelismo Radiocontrolado, Aparecida de Goiânia, GO 74980-070; Zeca, Carol, Warner or Rodrigo, 062 9979 9009; email: zeca.net@terra.com.br



Amoc Cassociaão de Modelismo B. Cambario, Bal. Cambario, South Carolina 88.330-000; Leo Cesar, (047) 366-0001



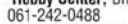
Brasilia R/C Motor Circuit, Brasilia, DF 70000; Alexandre (Alex), 55-061-273-7205



C.A.A.R. Curitiba Associacao de Automodelismo Radiocontrolado, Curitiba, Puerto Rico 82650-530; Ronaldo Assumpcao, 55-41-354-2804



Electric Car Club R/C Santos, Santos, Sao Paulo 11065-001; Estevam or Arnaldo, 55-013-232-2536



Hobby Center, Brasilia, DF 70.273, 061-242-0488



Hobby Planet Racing Club, Campinas, Sao Paulo 13091901; Daniel, Helio, Luciano, 019 258 2768



Jungle Drive, Rio de Janeiro, PB 21940-490; Paulo Brito, (021) 396-0851 or (021) 393-7449



Off Readers, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931



CANADA

ATN, Saint-Jean-Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097; email: durand@sogetel.net; web: public.sogetel.net/ldurand/



C.A.R.C.A.R., Calgary, Alberta; Kerry Nevatte, 403-630-8852; web: www.car-car.ca



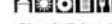
Cactus Speedway, Kingsville, Ontario N9Y 2V6; Bob Tanner, 519-326-3176; email: rtanner@wincom.net; web: www.sparcracers.com



Cam R/C, Coquitlam, British Columbia V3E 1K9; Roger Brown, 604-945-3888



Circuit J.C., St. Polycarpe, Quebec J0P 1X0; Jean Castellon, 450-265-3675



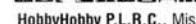
Circuit Teleguide ST Roch, ST Roch De L' Achigan, Quebec J0K 3H0; Gerald Beauchamp, 450-588-4254; email: gedoroam@colba.net; web: www.grcsr.com



Copetown Raceway, Copetown, Ontario; Adam Filipowicz; email: adamfilip@home.com; web: copetown-raceway.8k.com



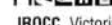
Dynamic Hobbies, Nepean, Ontario K2E7S4; Fred Zufelt, (613) 225-9634



HobbyHobby P.L.R.C., Mississauga, Ontario L5M 1K8; Tom Bakonyi, 905-858-7978; email: info@hobbyhobby.com; web: www.hobbyhobby.com



Honda House Motor Speedway, Chatham, Ontario N7M 1P9; John Elliot, (519) 354-5530



IROCC, Victoria, British Columbia V9B 5W9; Daryl Jones, (250) 47

Mini-Z Hobby Shop, Markham, Ontario L3R 0W4; Brian Pong, (905)940-0898; email: info@minizhobbyshop.com; web: www.minizhobbyshop.com



Prince George Radio Controlled Car Club, Prince George, British Columbia V2M 5R9; Doug Waller, 250-561-0035



R/C Champ Raceway, Scarborough, Ontario M1H 3A4; Ben, Matthew or Louie, (416) 289-8717; web: www.rchamp.com



R/C Fanatic, Charlesbourg, Quebec G1G 3Y4; Marc Page (Club President), 418-265-2678; email: info@rcfanatic.com; web: www.rcfanatic.com



Recreation R/C Raceway, Prince George, British Columbia; Doug Waller, (604) 561-0035



Steeltown Speedway, Binbrook, Ontario L0R 1C0; Trevor Harrison, 905-692-3407 (ask for Trevor); email: the_prodigy@znetonebox.com; web: www.geocities.com/s_speedway



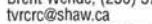
Sudbury Organized Auto Racing, Val Caron, Ontario P3E 1E6; Brad Peacock, 705-897-1435 (Brad); email: soarsudbury1@hotmail.com; web: www.sudburyrc.no-ip.com



The All New R/C World, Hamilton, Ontario L0R 1W0; Dave, Larry or Brian, (905) 765-2301 or (905) 333-3297



Thompson Valley R/C Raceway, Kamloops, British Columbia V2E 2K7; Brent Wende, (250) 372-2917; email: tvrcrc@shaw.ca

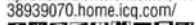


Vancouver R/C Road Racers, Coquitlam, British Columbia V3E 1K9; Roger Brown, (604) 945-3888

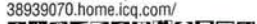


CHILE

Nico Prohens Off/On Roaders, Ovalle, 4 Region 1; Nicolas Prohens, (56) 53-711579; email: nprohens@entelchile.net; web: 38939070.home.icq.com

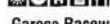


OFF/ON ROADERS, Santiago, Region Metropolitana 1; Mauricio Wetter Ferrer, (56)09-8404174; email: mwetter@entelchile.net; web: 38939070.home.icq.com



COLOMBIA

Club De Automodelismo Colombiano, Sanatafe De Bogota D.C., Bogota; Jorge Delgado, 1-6130588



Garoso Raceway, Cucuta; Gabriel Rodriguez, 975-751892



COSTA RICA

Club de Automodelismo RC10 Costa Rica, San Jose, San Jose; Osvaldo Averhoff A, (506)2862353; email: nitro-cr@hotmail.com



Hobbymania, Hispanidad San Pedro, Montes de Oca; Randall Jimenez, 506-280-9078; email: hobbymaniamanastore@hotmail.com; web: www.hobbymanias.com



CYPRUS

Racing Model Club, Nicosia; Andrea Sotiriou, 493186; fax 493229



DENMARK

Brondby Motor Club, Brondby 2605; Soren Boy Holst, 45-36-472-462



Holstebro R/C Buggy Club, Holstebro 2600; Michael Brusholt, 45-97-412-734



Klub 144 Raceway, Lyngby 2800; Henrik Carstens, 45-42-88-3691



Rainbow Raceway, Copenhagen 2600; P. Christiansen, 45-52-848-504



Thor Minirace Odense, Odense N 5240; Ulrich Rasmussen, 45-65-303-707



DOMINICAN REPUBLIC

Adoca R/C Speedway, Santo Domingo, (809) 220-5266



La Barranquita R/C International Speedway, Santiago, (809) 582-2303

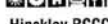


ENGLAND

Chessington Radio Car Club, Worcester Park, Surrey; Ian Spiller, 0252-20657



Hampshire Racing Center, Basingstoke, Hampshire; Tony Eudola, 44-1276-61402



Hinckley RCCC, Hinckley, Leicestershire; Bruce, 01455-890580



Snetterton Market Model Car Club, Norwich, Hampshire NR16 2JU; Lee Shore, 01760 724857; email: kekezza@fsmail.net; web: www.wheel-spins.co.uk



Worcester Model Car Club, St. John's, Worcester WR2 609; Mr. Hardy

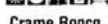


FRANCE

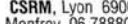
Auto Electron, Limoges 87000; M. Boudoul, 55 062763



Auto Model Club de l'ouest, Lojheret 29470; Peuziat Michel, 98071764



Crame Ronca, Mons el Baroeul; Michael Hondeky, 33-20042755



CSRM, Lyon 69009; Pierre-Yves Montfroy, 06 78880852



Lorgies Bolides, Lorgies 62840; Hourdequin Sabine

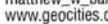


GERMANY

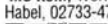
Dreykorn Raceway, Lauf 91207; Hermann Hensel, 09123-81457



MAC Zweibruecken, Hueffler 66909; Matthew Bailey, 011-49-6384-1388; email: matthew_w_bailey@hotmail.com; web: www.geocities.com/matthew_w_bailey



MC Koin, Worrigen 50769; Ralf Habel, 02733-477493



Mini Car Club Dortmund, Dortmund 4600; Roland Schwan, 0231/213609



Oberhausen-Alfstadt, Oberhausen 46099; Josef Holl, 0208-403676



Panik Raceway, Troisdorf 53844; Guido Kraft, 0224-400259



HONDURAS

Autodromo Accion, San Pedro Sula; Colonia Rivera Hernandez; Eduardo Hondal, (504) 52-2061



HONG KONG

H.K.R.C. Model Car Racing Club, Hong Kong; Alex Chan, (852) 659-2822



Kingsville Buggy Arena, Shatin; Pak Yeung, (852) 607-0828



INDONESIA

Abadi Circuit, Bandung, Jawa Barat 40141; Adi Darmawan, 62-22-2012250; email: darmawaa@bdg.centrin.net.id



Ancol, Jakarta, ACT 14350; Andre Supryana, 62 21 6506040; email: andre@cbn.net.id; web: www.auvis.com/ja



Jakarta International Twin Circuit, Dki Jaya, Jakarta; Fayakhun Andriadi, 6221-7512439; email: fayakhun@soon.com



Karinda Off-Road R/C Car Model Circuit, Jakarta-Selatan 12440; Wiwied W. Soedarmadi, 62-21-7900878



Pondok Cabecircuit, JL. Kunir No. 83, Jakarta; Ali Agus Salim, 7403568-9; fax 7491533



ISRAEL

IRCCA On-Road Raceway, Rishon Lezion 75650; Shachar Ken-Dror, 972-56-470037; email: dawn@dawn.co.il; web: www.touring-car.up.co.il



Nahshoneat, Haifa 32809; Golan Levy, (972) 039386444 or (972) 04231252



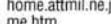
ITALY

AF MODELS RINGS, COLLEGNO, ACT 10093; ADRIANO FORATO, +39.335.82.58.434; email: afmodels@im-net.it; web: www.afmodels.com



JAPAN

Kadena R/C Car Club, APO, AP 96367; Ron Nason, 011-81-611-733-1334; email: Ron_Nason@hotmail.com; web: home.attml.net.jp/b/Carmen_Nason/home.htm



Xiwakuni R/C Track, FPO AP 96310-0978; David T. Eck, 81-6117-53-3662



Yokota R/C Racers, APO, AP 96326-0034; John Baker, 90-001-81-31175-7-6471; email: a4jb@yta.attml.net.jp



KUWAIT

Inferno DX 4WD Track, Ahadi 61002; Yousef Acqatari



LEBANON

Wild Willy RCC, Beirut, 00961-4-403751

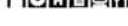


MALAYSIA

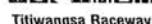
Acme Speedway, Georgetown, Penang, PB 10000; Moey Chee Cheong, 604-2613175 & 6012-4189388; email: s_jamm@hotmail.com



Jump Square Arena, Selanhor; Thomson Chong, (603) 656-2513



Niko Sales & Service Centre, Johor Bahru; Niko Cheng, (607) 234-3615; email: niko3@pd.jaring.my; web: www.niko.com.my



Ritiwangsa Raceway, Kuala Lumpur; R.A.C.E. Sdn Bhd., 03-2614496



TP Racing R/C Raceway, Selangor; WONG SOO WEI, +603 56388160; email: wong@tp-racing.com



MEXICO

Alces Off Road, Ensenada, BC 22830; Jorge Bustamante, 667-6-1476, 61477, 86729



Baja JR, Guadalajara, Jalisco 45000; Memo, Pancho, 33-3671-5432/33-3832-0155; email: baja_jr@hotmail.com



Club Dinamo Monterrey, Monterrey, Nuevo Leon 64890; Daniel Ornelas Elizondo, +52 (818) 3574588; email: daniel26or@hotmail.com



Club Kyosho Mexico, Mexico, DF 04330; Fernando Lopez, 52 55 (56894150); email: Omega@avantel.net; web: www.speedshopmexico.com



Desstrea Racing Club, Aguascalientes, Aguascalientes; Luis Lopez, 44 98 961296; email: luis_lopez@jabil.com



Hobby Centro, Guadalajara, JAL 45550; Alejandro Ortiz Del Toro, 36-21-46-28



Hobby Model's Raceway, Morelia, Michoacan 58260, 431-5-01-22



Hobby's Formula, DF 01120, 905-502-3620



Jaguar R/C Club, Puebla 72150; Denise or Chiro, 22-31-00-91, 22-33-00-94



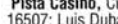
La Hielera, Queretaro, QRO 76160; Jorge Morelos Rabell, 42-12-15-25



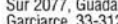
Micromotori Club, Jalisco, Jalisco 44640; Francisco Ortiz Sevilla, 52-36418672; email: fstmry@hotmail.com



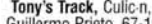
Nitro Racers, san jose del cabo / los cabos; Franco Meza, (114) 1424422; email: tctsafe@prodigy.net.mx



Pista Casino, Cuernavaca, Morelos 16507; Luis Duhart, 73-19-12-38



R/C Racing Hobbies, Lopez Mateos Sur 2077, Guadalajara; Marcelo Garcia, 33-3121-7185; email: ventas@rcracing.com.mx



Tony's Track, Culic-n, Sinaloa; Guillermo Prieto, 67-165708-168141

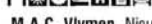


NETHERLANDS

ERCE Eindhoven, Eindhoven, ACT 5627In; Henk Fick, 040-2480607; email: info@erceracing.nl; web: www.erceracing.nl



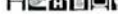
H.F.C.C. Hollandia, The Hague; G. de Jong, 031-070-3679820



M.A.C. Vlymen, Nieuwkuijk; Arjan van de Graaf, 31-416-376298



R.C.T.D. Circuit, Dordrecht, Zuid Holland 3316 GN; Jan van Kooy, 31-78-618-11-84; email: pkracing@bit.nl; web: www.pkracing.nl

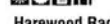


NEW ZEALAND

Capital Model Racers, Lower Hutt; Roger Whitmarsh, 04-566-5714



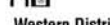
Counties R/C Raceway, Pukekohe; R Northcott, 09-23-86904



Harewood Radio Control Car Club, Christ Church; Dean Johnson, 09-0-3880 344



Papakura Indoor R/C Car Club, Auckland; Colin Perry, 09-298-4711



Western District R/C Off-Road Car Club, Auckland; Chris, 09-838-5201

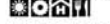


NORWAY

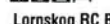
Aurskog R/C Club, Aurskog; Tommy Geleseth, 47-63-86-21-61



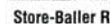
Dalen Raceway, Molde; Johnny Reitan, 94 64 52 95



Hadeland Raceway, Gran; Dag Bakke Nilssen, 61330405



Lornskog RC Bane Track, Sorlihavna; Terje Rosemo, 47-952-44269

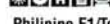


Store-Baller Raceway, 3/17/99 61330225; Ola Raastad



PHILIPPINES

Boyer R/C Hobby Shop, Rizal; Jose Chua, 721-2555



Philippine F1/Touring Club, Quezon City, Manila 1156; Raymond Aguilar/Ron Villafior, 896-64-15/23-30-08



Philippine R/C Association, Manila, Manila; Ronald/Manny Villafior, 23-30-08



QCRCC Quezon City Radio Control Car Club, Quezon City 1008; Desthy, Emer or William, 0917-8911698;

MERC Racing, Rustenburg, RSA
0300; Gerrie Pretorius, 014-5974569
☼☼☼

Norkem Raceway Club, Gauteng; Dan de Agrella, 2711-972-7011; email: craig@nmweb.co.za
☼☼☼

Parow Radio Car Club, Parow, Cape Province; Stirling Spengler, 021-945-4957
☼☼☼

Parow Radio Control Car Club, Parow, Cape Province 7530; Craig, +27 21 919-5859; email: craig@kingsley.co.za; web: www.speedmodels.za.org
☼☼☼☼☼

Phoenix Raceway, Stilfontein, Transvaal; Lionel Edwards, 018-4842863
☼☼☼

Pick 'n' Pay Model Car Club, Klerksdorp 2570; H. Grobbs, (27) 18 46245421
☼☼☼☼☼

Pietersburg Model Racing, Pietersburg, Northern Transvaal; Peter Van Vuuren, 0152-293-0700
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Pretoria Off Road R/C Club, Pretoria, Gauteng; Gert Swart, 012-377-3238
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Club Social Sevillana, Granada; Oscar Saenz, 958-275282
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PROCAR Speedway, Veddige 430 20; Lars Nordin, 46-0-340-38784; fax 46-0-340-38694; email: info@procar.se; web: www.procar.se
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Staffanstorps Highway 1:8 Track, Staffanstorps 245 45; B'rje Petersson, 46 0 46-256832
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torvinge raceway, rappestad, SP 59047 vikingstad; mats johansson, 013-808445; email: mats.j@swipnet.se; web: drive.to/mirac
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Touring 1:10 Raceway (& Mini-Z Raceway), Ronneby, Blekinge 372 35; Mikael Nilsson, +046 457 160 07; email: mickel2@telia.com; web: drive.to/rck
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JMRCV-Terrain du Levant, Geneva 1290, fax 19 41 22 7790805
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Hot Rod Raceway, Bangkok 10310; Mr. Vichai Vongphate, (662) 8602922-5
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Santa Paula R/C Club, Caracas; Abecasis or Franco Agrusa, 02-2423954 or 02-4510314
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NEW OPTIONS! We now have two new symbols to help our readers find your tracks!

 Road course layout

 Mini and micro RC cars (Kyosho Mini-Z, HPI Micro RS4, etc.).

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Check all that apply

- | | | |
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| <input type="checkbox"/> Outdoor | <input type="checkbox"/> Carpet | <input type="checkbox"/> AC power |
| <input type="checkbox"/> Off-road | <input type="checkbox"/> Concrete | <input type="checkbox"/> Automatic lap-counting |
| <input type="checkbox"/> On-road | <input type="checkbox"/> Asphalt | <input type="checkbox"/> Food available |
| <input type="checkbox"/> Oval | <input type="checkbox"/> Minis & Micros | |

KEY TO SYMBOLS

- | | |
|--|--|
|  Indoor |  Concrete |
|  Outdoor |  Asphalt |
|  Off-road |  Minis & Micros |
|  On-road |  On-site hobby shop |
|  Oval |  AC power |
|  Dirt oval |  Auto lap counting |
|  Carpet |  Food available |

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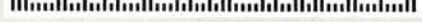
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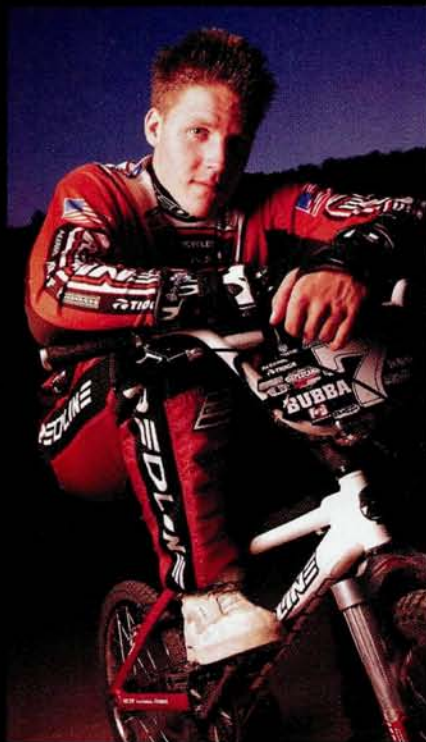
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BY PETER VIEIRA

RANDOM RADIO CONTROL RAMBLINGS

WANT TO CONTACT THE BACKLOT? Email backlot@airage.com, or write to Backlot, c/o RC Car Action, 100 East Ridge, Ridgefield, CT 06877-4606 USA.



RC VS. BMX

IF YOU FOLLOW BMX RACING, then you already know that Bubba Harris is the big man in the American Bicycle Association (ABA). Who better to pit against a couple of RC cars to see which is fastest, man or machine? Mugen's Chad Bradley and Kyosho's Greg Degani lined up their MBX-5 and Ultima Evolution against Bubba and his signature Redline. Who won? You'll just have to pick up the March issue of *RC Nitro* to find out!



You liked it!

In the December "Backlot," I asked you to rate my B4's monochromatic look. Where do you fit in?

77% liked it
33% hated it

■ OF THE 77% WHO LIKED IT, nearly 1/2 mentioned the sunroof.
■ NEARLY 100% WHO HATED IT particularly disliked the black wheels.

■ AS PROMISED, I chose a winning "hater" and "lover" at random. Your *RC Car Action* T-shirts and decals are in the mail.

Loved it

"Who says you have to have flames of swirls or scallops to have a nice, crisp body? I recently painted a Pro-Line Stratus body for my Nitro 4-Tec using the same scheme you did on the B4. Cool beans."

—Jack Ballard

Hated it

"Plain bodies are OK on some cars, but buggy bodies need flair! They need a paint scheme that screams speed. The orange on this buggy looks like a color one would find on a busted ol' Pinto in someone's backyard."

—Staff Sgt. Marcus D. Hogsten



HEADS EXPLODED: ZERO

So much for my "tough" brainteasers in the December ish's "Backlot"—hundreds of you nailed the right answers. Here they are for the rest of you:

Q: If three drivers can each run three laps in three minutes, how many drivers will it take to run 18 laps in nine minutes?

A: Two. You can factor out the "three drivers" part; the important thing is each driver takes one minute per lap. So, if one guy can turn nine laps in nine minutes, two guys turning one-minute laps would turn 18 laps in nine minutes.

Q: There are 12 cars on the track. Some are red with orange flames, some are all red and some are all yellow. One third are solid orange. Is it true that four cars are yellow?

A: OK; you've got 12 cars, and 1/3 are solid orange (hey, just like my B4!). That leaves eight cars of questionable color. For the word "some" to apply, at least two have to be red with orange flames, so that leaves six; at least two more must be all red, so that leaves four. Thus, it is possible that four are solid yellow—but impossible to say whether the statement is "true" or "false," which makes me think I did the math wrong when I worded the question.

Q: Which is heavier: a pound of aluminum or a pound of titanium?

A: "Which is heavier: a pound of feathers or a pound of lead?" My dad got me with that one when I was 9, but none of you fell for my RC version. A pound is a pound.